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ABSTRACT

The Kentucky Long-Term Policy Research Center is engaged in a continuing effort to understand implications of an array of trends and policies affecting the state. This report examines the status of Kentucky's teacher workforce and offers recommendations on ways to enhance it. The five chapters are: (1) "Introduction"; (2) "Teacher Quality in Context" (e.g., national and state attention on teacher workforce issues); (3) "Indicators of Teacher Quality" (e.g., teacher experience and education levels and students completing teacher training programs); (4) "Teacher Quality and Future Issues" (e.g., teacher turnover, teacher supply and demand, and teacher salaries); and (5) "Conclusions and Policy Options" (e.g., the comprehensive education data system and creating a supportive system for teacher workforce improvements). There are four appendixes: student achievement in Kentucky; Kentucky's teacher training system; professional development issues; and reviewer's comments. (SM)

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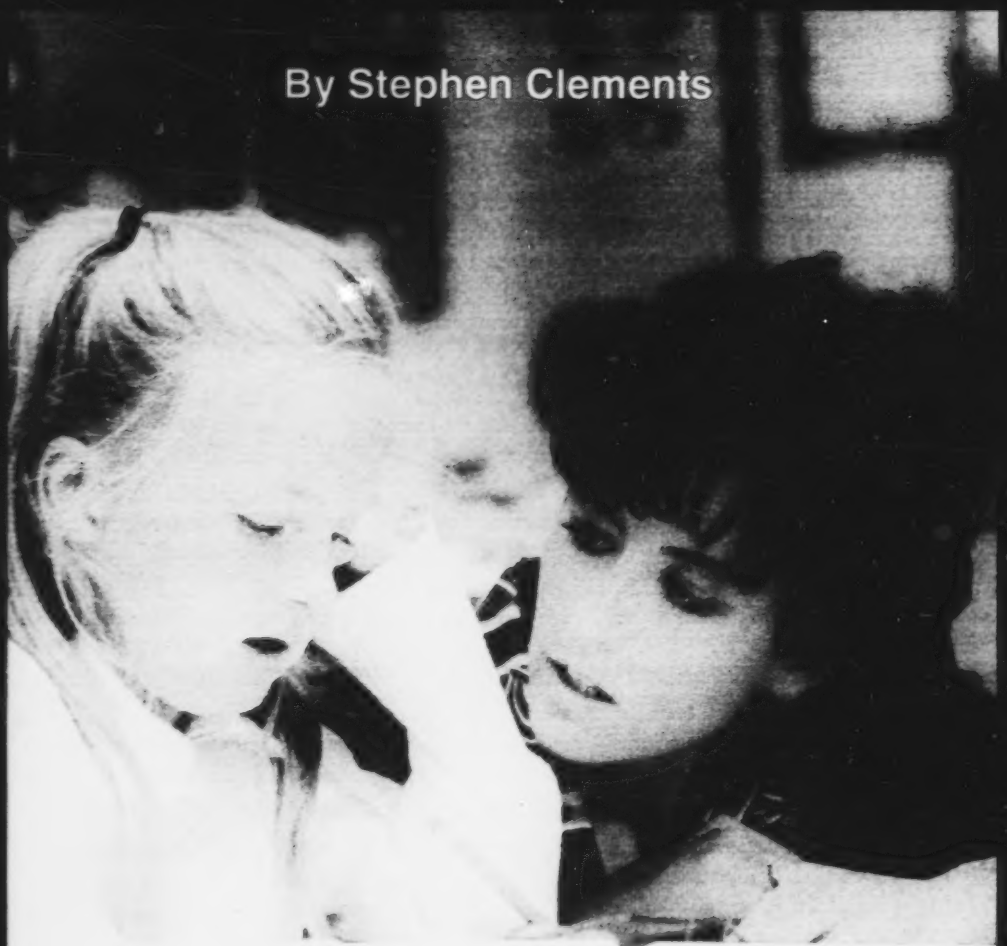
Kentucky's Teachers: Charting a Course for KERA's Second Decade

By Stephen Clements



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by
Stephen Clements

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PREFACE

The Kentucky Long-Term Policy Research Center is engaged in a continuing effort to understand the future implications of an array of trends and policies affecting the Commonwealth. In this report we examine the status of Kentucky's teacher workforce and offer recommendations on ways to enhance it. This report should be of interest to anyone concerned with the status of education and education reform in Kentucky.

THE KENTUCKY LONG-TERM POLICY RESEARCH CENTER

The Center was created by the General Assembly in 1992 to bring a broader context to the decisionmaking process. The Center's mission is to illuminate the long-range implications of current policies, emerging issues, and trends influencing the Commonwealth's future. The Center has a responsibility to identify and study issues of long-term significance to the Commonwealth and to serve as a mechanism for coordinating resources and groups to focus on long-range planning.

Michael T. Childress is the executive director of the Center. Those interested in further information about the Kentucky Long-Term Policy Research Center should contact his office directly:

THE KENTUCKY LONG-TERM POLICY RESEARCH CENTER
111 St. James Court
Frankfort, Kentucky 40601
Phone: 502-573-2851 or 800-853-2851
e-mail: ltprc@lrc.state.ky.us
www.lrc.state.ky.us/ltprc

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Photo by Rick McComb, Kentucky Department of Education

SUMMARY

As we near the 10th anniversary of passage of the Kentucky Education Reform Act (KERA), the historic 1990 legislation that rewrote the state's school laws, it seems an especially appropriate time to consider the effects of KERA and other state policies on the quality of Kentucky's teachers for several reasons. First, teacher improvement was at the heart of KERA and education reform initiatives that preceded the reform act. Second, KERA components have now been fully implemented, and evidence about the state's ability to improve public schooling through KERA has been slowly accumulating. Third, the state is nearing the halfway point of its anticipated two-decade-long systemic reform initiative. If mid-course corrections are needed to enhance reforms, the year 2000 may be the ideal time for policymakers to consider them.

This is also an opportune time to examine Kentucky's teaching force in light of a national effort to move improvement of teacher knowledge and skills to the top of federal and state policy agendas. The National Commission for Teaching and America's Future (NCTAF) has spearheaded this movement, but many other organizations, including the two national teachers unions and some state affiliates, as well as groups like the Southern Regional Education Board, are also focusing new attention on policies for upgrading the teacher workforce. Teacher quality is therefore likely to be prominent on the political agenda over the next few years.

Because Kentucky has targeted its reform efforts toward improving teaching, because teacher quality is rising on the public agenda, and because evidence of the importance of good teaching is mounting, it is appropriate for Kentuckians to consider the state of the teacher workforce. This report presents up-to-date information on teachers and teacher policy issues in the Commonwealth and provides a framework for consideration of ways to upgrade Kentucky's teacher workforce.

What the Best Available Evidence Says about Kentucky's Teachers

The data on Kentucky teacher quality offers mixed assessments. Several recent national studies of teacher quality rate Kentucky's teacher workforce system among the best in the nation, but the indicators used in these analyses are heavily weighted toward measures of a variety of input, rather than "output" measures of what teachers know and what they can do in the classroom. Commonwealth teachers are also about as experienced as their counterparts elsewhere and have achieved significantly greater amounts of graduate training than the typical teacher in the nation. In addition, the ACT scores and GPAs of those entering Kentucky's teacher training system in recent years are above state and national averages, and these students carry GPAs above 3.0, even though the minimum acceptable score for entering these institutions is 2.5.

More mixed results come from tests given to graduates of Kentucky's teacher training programs. According to 1993-1996 data collected by Kentucky's Office of Teacher Education and Certification (OTEC) from Kentucky's 26 teacher training institutions, graduates of these teacher preparation programs score at the national average on the three "core" knowledge and skill batteries of the Praxis II exam (the new name for the old National Teachers Examination). They score at or slightly above the national average in several categories, including biology and general science; math; physical, business, and music education; and educational leadership, administration, and supervision. But in a dozen other disciplinary areas, Kentucky teacher training graduates seeking certificates scored below the national median scores on the Praxis subject area exams.

In addition, out-of-field teaching—defined as teaching at the middle or high school levels in a subject in which one has neither a college major nor minor—seems to be a problem in Kentucky, as elsewhere, although its full extent is unknown. According to the national 1993-94 Schools and Staffing Survey studies, the problem in Kentucky appears most acute in math, English, history, and certain areas of science. For this report, a study of middle school math teacher transcripts found that out-of-field teaching is a problem at this level. *Indeed, if teaching "in field" is defined—following NCTAF—as having a math or math education major or minor, only 39 percent of middle school math teach-*

ers in Kentucky received ample college coursework in math, and the remaining 61 percent are teaching out of field.

It is unclear how much of a problem this is in other subject areas and at the high school level. Moreover, the Kentucky Department of Education's (KDE) data collection system cannot assess the extent of out-of-field teaching, as determined by majors or minors. Instead, KDE relies on its certification system, which currently shows an almost fully certified teaching force in the state. Conspicuously absent from the available data is information on actual teacher performance in the classroom, or on relationships between student performance and teacher qualification levels. Simply put, we now have no way of linking the skill and knowledge levels of teachers, either individually or collectively, with the performance of their students—the key outcome variable of the public schooling system. In spite of the difficulties of measuring teacher quality, data that allow officials to make *some* judgments about teacher quality and student performance should arguably be part of an effective accountability system, as well as a tool for planning professional development and staffing for schools.

Issues Policymakers Will Face in Improving Kentucky's Teacher Workforce

Teacher Retirement

The next few years provide an opportune moment to make further changes aimed at improving the teacher workforce, in part because a considerable portion of Kentucky's teachers are nearing retirement age and may be leaving classrooms over the next few years. According to data generated in 1997 by the Kentucky Teachers Retirement System (KTRS), about a quarter of the teacher workforce is at or within about three years of retirement eligibility, currently 27 years of experience. In Kentucky, the average teacher retires with about 27 years of service.

Teacher Supply and Demand

At the aggregate level, Kentucky does not appear likely to face significant shortages of certified teachers although problems may arise in certain disciplines and geographic areas. One study suggests Kentucky should expect a 1 percent to 4 percent surplus of teachers in elementary schooling, social studies, language arts, math, biology, and art. Slight shortages will likely exist in the subject areas of chemistry and physics, with more significant shortages—6 percent to 8 percent—in teachers certified to deal with learning disabilities, speech disorders, and those with multiple handicaps. However, other data suggest possible greater shortages. A study by the National Center for Education Statistics in Washington, D.C., showed that in 1993-94 between 11 percent and 17 percent of Kentucky high schools had difficulty filling math, physical science, biology, and English teaching positions. One in five elementary and secondary schools reported problems finding special education teachers. If the certification system in Kentucky were changed so that a major or minor in one's subject is the minimum qualification for teaching, teacher shortages would likely be a more serious problem statewide.

Teacher Salaries

According to the latest available data, the average teacher salary in Kentucky during 1996-97 was just under $34,000 per year or about 87 percent of the national average teacher salary. Kentucky teachers have been remunerated at about this level for several years although the percentage drifted downward in the 1980s to around 84. Kentucky's teacher salary average ranks 28th among the 50 states, even though the state ranks 42nd in terms of per capita income. Moreover, the average salary masks the range of salaries: the most experienced and highest ranking elementary and secondary teachers, for example, earn salaries in the $42,000 to $43,000 range while early career teachers at lower rank and experience levels typically receive salaries between $24,000 to $30,000.

Based on an array of salary data, it does not appear that Kentucky teacher salaries are grossly out of line with those of other jobs available within the state that require a similar level of educational attainment. However, we simply do not know how the teacher salary structure affects the quality of those attracted into teaching. Individuals in some white-collar professions, such as law, medicine, and civil engineering, earn considerably more than teachers. If policymakers hope to attract into and retain in teaching the best and brightest, then salaries and career options might more appropriately reflect those available in these more prestigious, more highly remunerated careers. While these professionals begin careers at modest salary levels, those who excel have much greater financial opportunities than do classroom teachers.

If Kentucky policymakers were to raise teacher salaries across the board and incrementally over 10 years to reach the national average, how much would this cost the state? Assuming national teacher salaries continued to increase over this period at 2.5 percent per year, then Kentucky teachers would need to receive a 4 percent raise each year of the coming decade. At that rate of increase, certified personnel salaries and benefits would be about 12 percent higher than they would be otherwise. The cumulative *additional* spending on certified staff salaries over this period would be more than $1.75 billion. An alternative, and less expensive, scenario would be for policymakers to boost Kentucky teacher salaries from 87 percent of the national average to 91 percent of the national average—which is roughly the cost of living in Kentucky compared to the nation. Again assuming a 2.5 percent national teacher salary growth rate, Kentucky teacher salaries would reach this 91 percent level after 10 years by growing 3 percent per year rather than 4 percent. In this scenario, certified personnel salaries and benefits would add additional spending over 10 years of about $500 million.

Teacher Training

Kentucky's 26 teacher training institutions are phasing in a performance-based teacher preparation program, preparing students to meet standards approved by the Education Professional Standards Board (EPSB), rather than simply fulfilling course requirements. Rather than dictate to teachers colleges what their students must study, the EPSB has identified what new teachers should know and be able to do. Education colleges and departments then determine how to teach students to meet the standards and how to empirically measure student progress. A student may graduate only after demonstrating that he or she meets the standards and is competent in all effective teaching skills.

Many knowledgeable experts believe this new approach will significantly improve the training of educators in the state. The emphasis on demonstrated performance of skills and verification of knowledge levels, these proponents argue, will lead to more capable, versatile, learned, adaptable, and self-reflective teachers in Kentucky classrooms. However, unless a better teacher data system is constructed, it may be difficult to determine how effective the new system is in training teachers and what effects the differently trained teachers will have on the quality of the teacher workforce. In addition, this new system relies on teacher training institutions to be, in essence, self-policing and self-correcting. It remains to be seen if institutions that informally set lower performance criteria on the new teacher performance standards will be identified. Finally, the movement *away* from minimum coursework requirements may conflict with the assumption that middle and secondary school teacher trainees should have at least a minor in the subject they plan to teach.

Alternative Certification

While the idea of alternative certification has been around for years, some individuals who have extensive subject area expertise and effective communication skills still cannot become certified unless they have many hours of undergraduate level teacher training credits. Alternative certification programs typically allow knowledgeable people into supervised classroom settings without imposing burdensome coursework requirements. KERA, indeed, included a provision requiring KDE to develop and implement an alternative certification program to help channel second-career professionals or others with knowledge, expertise, and enthusiasm into the state's schools. Though various alternative certification routes have been in place for several years, relatively few individuals have taken

them in Kentucky. Although alternative certification seems a sensible approach to human resource deployment, it is unclear what role it will play in the next decade of Kentucky school reform.

Teacher Professional Development

Kentucky has made considerable strides in increasing professional development funding and vesting control over services at the school and district levels. Kentucky has been spending $14.5 million on professional development or about $23 per student, an expenditure level surpassed in the South only by that of Georgia and North Carolina, both of which have a larger cadre of teachers. National data from 1993-94 show that Kentucky teachers are participating in professional development on important topics at a considerably greater rate than their counterparts in most other states. Several outside researchers have concluded, among other things, that professional development in Kentucky has improved considerably under more direct teacher control and at higher funding levels. But the system needs to improve still more, both to focus more on content knowledge and to shift toward the types of ongoing professional development activities that change teaching behaviors. In general, KDE has very little good data about the scope and quality of professional development services being provided in the state and no way to assess the impact of professional development.

Recommendations

The issue before policymakers regarding teacher quality does *not* seem to be one of addressing a crisis. According to available evidence, Kentucky's teacher workforce is sound compared to those in other states, but the data indicate that some proportion of middle and high school teachers may not have studied the subject matter they teach as extensively as they should have, although the extent of the problem, its geographic distribution, and its effects on student achievement are unknown. Likewise, while Praxis scores of recent teacher training program graduates indicate problems in some subject areas, core battery scores are at about the national average.

Rather, the issue is one of moving more purposively and systematically toward developing a teacher workforce that is equipped to take Kentucky's schoolchildren to higher levels of academic proficiency in the next decade. Current policies seem unlikely to move us rapidly in the direction KERA directs. Student test scores, on both the Kentucky Instructional Results Information System (KIRIS) and National Assessment of Educational Progress (NAEP) examinations, have been improving modestly, which again suggests basic teacher competency in the state. But test scores and other performance indicators have not been rising rapidly enough to meet the ambitious educational goals set for the state in 1990, and suggest that more work needs to be done to improve teacher knowledge and skill levels. Policy changes could be made in a number of key areas.

Build a Comprehensive Education Data System

A primary policy option is the creation of a comprehensive data system to track teachers in the workforce. Such a system would not be punitive in purpose, but, rather, constructed to ensure that teachers are being properly deployed given their training and backgrounds, to determine what types of professional development and educational support teachers need, to gauge supply and demand imbalances, and to ascertain what combination of teacher knowledge and skills has the greatest impact on student achievement. Until we learn more about these things through a well-designed data gathering program operated over several years, officials will be obliged to tinker with the system based on personal beliefs, experiences, and intuitions, as well as possibly contradictory input from constituents and special interest groups, rather than empirical data. Moreover, unless the right kind of data system is put in place, subsequent efforts to determine the status of the teacher workforce in Kentucky will continue to be frustrated by the lack of policy-worthy information.

Dramatically Improve the Professional Development System

If Kentucky policymakers want improvements in teacher knowledge and skills sooner as opposed to later, they will need to focus efforts on educators already in the classroom and the professional development system, which is presently ill equipped to take on the task. Kentucky's professional development system could be moved in a more productive direction, but to do so would require a concerted state policy effort as well as a variety of incentives to attract—or create—high-quality providers to deliver a professional development program solidly grounded in academic content. Provisions would also be needed to ensure effectiveness and targeted program delivery with follow-up and ongoing involvement. Some professional development shortcomings could be addressed through technological means. Additional policy changes may be needed to encourage academic experts to be more responsive to the needs of the state's middle and secondary school teachers.

Pre-Service Teacher Training

The performance-based teacher preparation system now being phased in appears to improve on the previous approach, but the new system should be closely monitored to ensure high levels of academic subject area competence, especially among those planning to teach at the middle and high school levels. Teacher training institutions could, for example, be obliged to publish output or performance measures that would permit evaluations of the quality of the various programs.

It is also difficult to tell if teacher education programs, particularly in the eight state universities, are funded at an appropriate level to implement performance-based education, and in general to prepare teachers for excellence in the classroom. It is conventional wisdom in Kentucky and elsewhere that university teacher training programs bring in more revenue than they are given in their budgets, and that training teachers is funded at a considerably lower level than training dentists, doctors, and many other professionals. This is certainly an issue that warrants serious attention by policymakers.

Moreover, state officials and others might also engage in a public dialogue about what it means for teachers to be well prepared to teach a particular subject. If Kentuckians agree, for example, that middle or high school teachers should major or minor in the academic subjects they teach, then the EPSB could review policies to determine if this is being done at all institutions in the state. The EPSB could also require previously certified teachers to demonstrate adequate content knowledge, via professional development programs or completion of university courses. It could also oblige teachers who have demonstrated subject mastery to continue broadening their content knowledge, under the assumption that the ongoing learning process helps teachers remain intellectually nourished and continues to stimulate student minds. In sum, state leaders might consider addressing forthrightly the issue of what defines teacher competence in content area knowledge and ensuring that teacher training become a bona fide lifelong learning system. Teachers would understand early in their careers that they would always be active, reflective learners, with a range of formal learning options available to them throughout their careers. Moreover, they would be rewarded in terms of salary, recognition, and leadership opportunities, thus strengthening the entire school community.

Institute Career Path Options and Salary Improvements for Teachers

It seems unlikely that a policy debate in Kentucky involving only across-the-board teacher pay increases will bear much fruit. Rather, as with the debate over the policy package that became KERA, teacher salary increases might be linked to a range of reforms. These reforms might focus on multiple career "tracks" within elementary and secondary education, each of which would have different learning requirements, time commitments, and professional goals. Currently, all teachers follow roughly the same professional route, regardless of their interests and dedication. They advance through the rank and salary schedule by meeting certain education requirements. And those who aspire to higher salaries or greater responsibilities generally must do so by leaving the classroom and entering the administrative ranks.

An alternative approach would offer additional career tracks that give substantially greater salaries in return for longer contracts, work on a broader range of school-based needs, participation in—and provision to others of—more and better subject matter, intensive professional development activities, the assumption of greater leadership roles in school, and demonstrated performance in the classroom and on assessments of various sorts. The idea here would be to marry compensation to a greater variety of educational skills and knowledge in much the same way that the Highly Skilled Educator program has done, although these career options would be open to a far greater number of individuals than is the HSE program. Teachers would also be allowed to pursue these various routes at different points in their careers and could switch depending upon their interests, personal development, and life situations.

Alternative Certification and a New Incentive Structure

A greater array of teacher career options, with higher salaries, increased responsibilities, and better professional development, might also make the profession more attractive to individuals seeking career changes. The EPSB has approved various alternative certification options although it has done so slowly and with caution. While EPSB's concerns are understandable, it makes sense to continue expanding alternative certification routes. There is no obvious reason why a decision *not* to enter a teacher training program at age 20 should prevent individuals who may have much to offer students and school communities from moving toward the classroom later in life.

Conclusion

This report raises a host of issues about teacher policies. It argues that teacher quality issues will likely be prominent on the public and political agenda over the next few years. It presents a range of data on teachers and teaching in the state, although these data are limited in their usefulness. It hints at the complexities surrounding teacher workforce issues and policies. And it briefly sketches policy options that might be pursued. This brief look at a limited number of issues could easily be expanded to include other issues that come into play when we reflect on the teacher policy domain.

The key point with which to end the report, however, is as follows. Given the importance of teacher preparedness to the future of public education, its complexity, the limitations on the data, the interconnectedness of the available policy options, and the need for educators themselves to be personally and collectively invested in upgrading the teacher workforce, the citizens of Kentucky need to become actively involved in a public dialogue about teacher quality. Any teacher improvement policy package that might be effective would need a coherence wrought through much public discussion about the nature of teaching, schooling, and community life. Any such reform effort would also likely be expensive, another reason why it must emerge from a political process founded on public discussion of the best and most feasible route to a better teacher workforce. The foundation of such a public debate should be data and information of the sort presented here and of the sort that might be generated by agency officials, researchers, and interest group representatives over the next year or more.

--It is likely, too, that such an effort will be the next logical step in the school reform journey on which Kentucky embarked in 1990. Inasmuch as HB 940 represented a down payment upon significant educational improvement in the Commonwealth, then a series of measures to make teaching a profession attractive to a greater variety of gifted individuals and to equip teachers with the skills and knowledge they need to meet KERA's ambitious achievement goals would seem to be a sensible route for policymakers and informed lay citizens to take as we enter a new millennium.

GLOSSARY

ASME	Advanced Systems in Measurement and Evaluation, Inc.
CATS	Commonwealth Accountability Testing System
CTBS	Comprehensive Test of Basic Skills
DDA	Data and Decision Analysis, Inc.
EPSB	Education Professional Standards Board
HSE	Highly Skilled Educator
KDE	Kentucky Department of Education
KERA	Kentucky Education Reform Act
KIER	Kentucky Institute for Education Research
KIRIS	Kentucky Instructional Results Information System
KTIP	Kentucky Teacher Internship Program
KTRS	Kentucky Teachers Retirement System
NAEP	National Assessment of Educational Progress
NCATE	National Council for the Accreditation of Teacher Education
NCES	National Center for Education Statistics
NCTAF	National Commission for Teaching and America's Future
OEA	Office of Education Accountability
OTEC	Office of Teacher Education and Certification
PSD	Professional Staff Data
SASS	Schools and Staffing Survey
SREB	Southern Regional Education Board
TIMSS	Third International Math and Science Study

ACKNOWLEDGMENTS

The story of this report is a testament to serendipity, discernment, and support. In 1997 I was in the throes of a doctoral dissertation project on the politics of the formulation and passage of KERA, Kentucky's systemic school reform initiative. That summer I began an internship at the Kentucky Long-Term Policy Research Center in Frankfort, and was also engaging in *ad hoc* research tasks for the Prichard Committee. One of those tasks took me to visit Betty Lindsey, then executive director of the state's Education Professional Standards Board (EPSB). Betty enlisted my help in undertaking a "policy audit" of Kentucky's teacher training and certification system, a project of the National Commission on Teaching and America's Future.

This I agreed to do while pursuing other project work at the Long-Term Policy Research Center. Michael Childress, the Center's executive director, and I had periodic conversations about the policy audit work. It soon became apparent to both of us that the information I was collecting for the audit could prove valuable to legislators and those who move in and around policy circles in Kentucky. With Mike's encouragement, therefore, and with the support of the Center's Board—under the leadership of both Sen. Nick Kafoglis and University of Kentucky Professor Penny Miller—I completed a draft of the policy audit, and then turned to reformulating that information into a publication for the Center. Mike also enabled some additional work to take place, namely the middle school math teacher transcript study discussed in chapter three, and the teacher salary increase cost projections discussed in chapter four. Pete Schirmer provided much appreciated assistance analyzing the transcript data and forecasting the cost of salary increases for teachers. The report exists, in short, because I was in the right place at the right time, because of Mike's belief in the relevance of the project to the Center's mission, and because the Center's Board deemed it worthwhile. These individuals deserve plaudits for their help.

Many others played a significant role in this project, a few of whom I will mention here. Audrey Carr of the Legislative Research Commission and Bob Sexton of the Prichard Committee for Academic Excellence provided helpful comments on an earlier draft of this report. Susan Leib, Betty Lindsey's successor as executive director of the EPSB, was tremendously helpful during the policy audit portion of the project. Various EPSB staff members, such as Rita Osborne, Rhonda Tamme, and Marilyn Troup, answered questions and supplied documents and data willingly, even though I often dropped in on them without warning. I am particularly grateful to have received help from William White, Research Director for the Kentucky Department of Education, and from Pat Hartanowicz, an EPSB consultant. In addition, I wish to thank several reviewers, such as Billie Sebastian, Jerry Sollinger, and Michal Smith-Mello, whose edits and suggestions have kept me from my own worst grammatical and rhetorical tendencies.

My hope for this report is that it helps prompt much-needed discussion among policymakers and members of the public about teacher quality, that it injects into that discussion a modicum of useful data, and that it leads to a better teacher quality data system. This is a difficult subject about which to write, given the (correct) perception of teachers that they are undervalued by our society, and expected to work wonders with our children whether or not we support them in the process. Limitations on available data, much discussed in the pages that follow, also raise the level of uncertainty in our knowledge about teacher quality. Yet the need to grapple with teacher quality issues remains if we are to continue making educational progress in the Commonwealth.

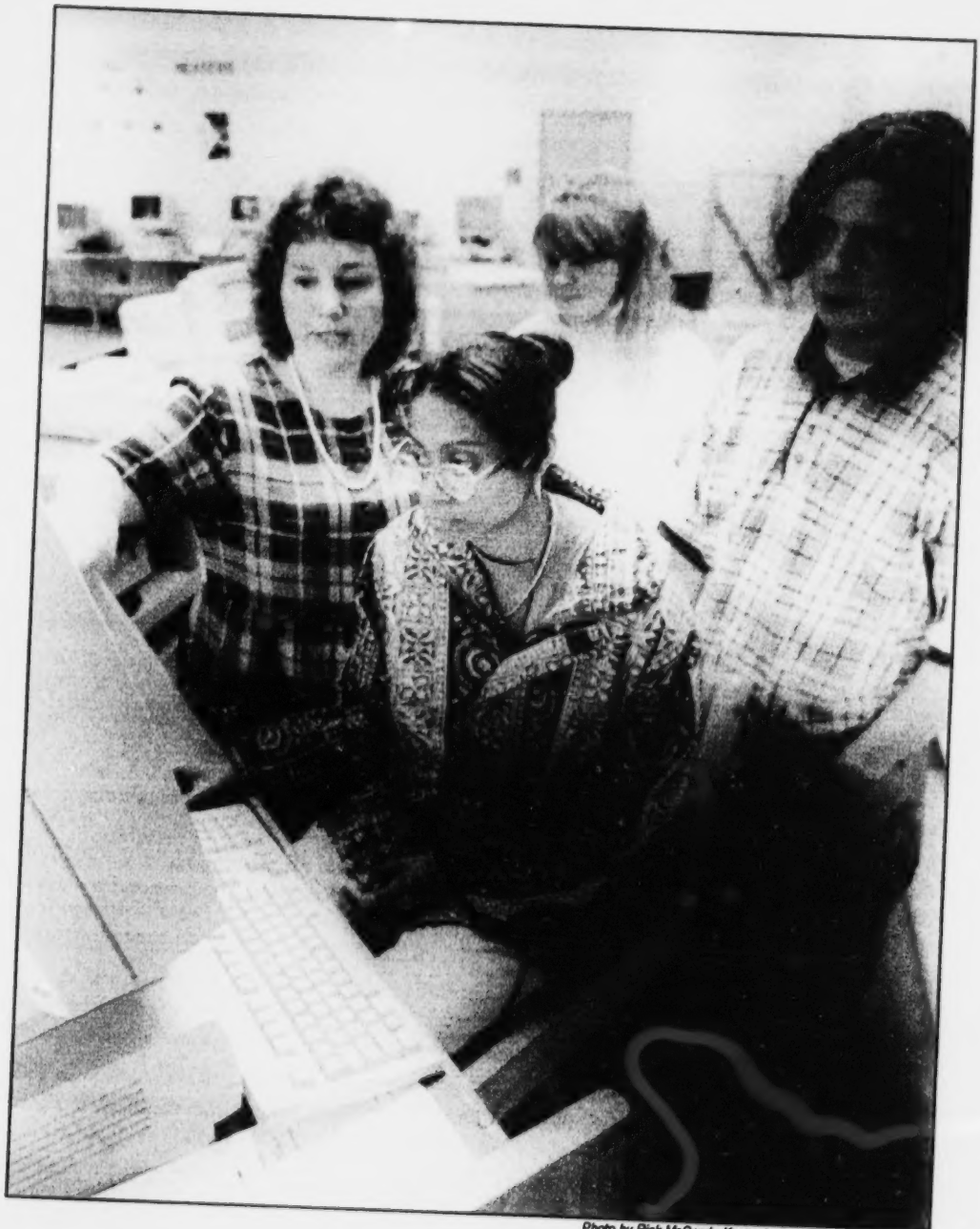


Photo by Rick McComb, Kentucky Department of Education

INTRODUCTION

With the year 2000 on the horizon, the Commonwealth of Kentucky is nearing the 10th anniversary of passage of the Kentucky Education Reform Act (KERA), the historic 1990 legislation that rewrote the state's school laws. This is an especially appropriate moment to consider the effect of KERA and other state policies on the quality of Kentucky's teachers, for several reasons. First, teacher improvement was at the heart of KERA, and of various other education reform initiatives promoted in Kentucky throughout the decade that preceded the reform act. Indeed, from a certain perspective, most recent reform activity in the state has been directed toward improving teacher knowledge and skills. In 1984, for example, Kentucky became one of the first states to institute an internship program for beginning teachers. In 1985, the General Assembly passed in a special legislative session a range of programs to give teachers better tools to address the educational needs of students. Also during the 1980s the state phased in higher entrance standards to Kentucky's teacher training institutions.

Moreover, key components of KERA are teacher oriented. The school-based councils, for example, effectively gave teachers—along with principals—control over most matters of curriculum, personnel, and professional development. The core curriculum and assessment systems were developed, in part, to provide a roadmap for teachers and other school personnel. The accountability system was designed to provide rewards or sanctions and support to teachers.

Much of the new resources funneled into the public school system through KERA have been used to increase the numbers of teachers and aides. In the first five years of reform, the teacher workforce in Kentucky grew from 35,558 to 38,063, or about 9 percent. Even though student enrollment only increased by 1 percent during this period, schools added new teachers and aides to lower pupil-teacher ratios, provide support services, and offer new programs such as kindergarten and preschool. Indeed, a considerable portion of the overall state and local education dollar is devoted to the teacher workforce.

The preferred approach to school reform in Kentucky, therefore, appears to be to improve the teacher workforce by increasing entry standards, giving teachers greater influence over crucial educational decisions, and motivating them through an array of incentives. The success of reform in the Commonwealth will largely hinge upon the extent to which teaching and learning improves as a result of these systemic changes.

This is an especially appropriate time to consider the effect of KERA on the quality of Kentucky's teachers.

Another reason to consider teacher quality in light of KERA is that reform components have now been fully phased in. Evidence about the state's ability to improve public schooling through KERA has slowly been accumulating, and sufficient information is now available to make some informed judgments.

In addition, the state is nearing the halfway point of its systemic reform initiative—KERA's designers viewed upgrading radically the public school system as a process that would take at least two decades. If state policymakers wish to make mid-course corrections that might enhance reform effectiveness, the millennial year might be an ideal time to do so.

This is also an opportune time to look at the teaching force in Kentucky because a national effort is under way to move the improvement of teacher knowledge and skills to the top of federal and state policy agendas. The National Commission for Teaching and America's Future (NCTAF) has spearheaded this movement by marshaling research evidence that good teaching matters, promulgating policy options its members think will strengthen teaching, and enlisting partner states to examine their own teacher policies. But many other organizations, including the two national teachers' unions and some state affiliates, are also focusing new attention on policies for upgrading the teacher workforce. Teacher quality is therefore likely to dominate the political agenda over the next few years.

By several measures, Kentucky teachers are doing well. On average, they have received more graduate training than their peers in most other states. Many were mentored as they began their careers. And nearly all teachers have received appropriate certification. Though Kentucky teachers are still being paid less than the national average, teacher salary increases have kept pace with educator salary growth elsewhere, and teacher salaries in the Commonwealth compare favorably to those in many other occupations. Moreover, the students being drawn into teaching in the state score above state and national averages on college entrance exams. In addition, state teacher training institutions have for years overproduced teachers. As a result, Kentucky in the aggregate does not appear to face serious teacher shortages as some other states do.

These findings suggest Kentucky has been making progress in strengthening its teacher workforce. They also perhaps help to explain why Kentucky students score close to the national average on standardized tests, even though a quarter of the state's children live in poverty.

At the same time, Kentucky teachers may not be equipped well enough to move large proportions of Kentucky students expeditiously into the highest achievement categories on assessments such as the Kentucky Instructional Results Information System (KIRIS), the National Assessment of Educational Progress (NAEP), or the forthcoming Commonwealth Accountability Testing System (CATS) tests, a goal of KERA's founders. This conclusion rests on several less optimistic pieces of information. First, recent teacher education graduates—the above average students entering teacher training programs—in some fields have scored worse on subject area competency tests than new teachers prepared in other states, suggesting problems in the state's teacher preparation system. The teacher preparation and certification system *is* currently being changed dramatically to reflect the performance-based approach advocated by NCTAF and certain other organizations and which is embedded in KERA. The potential impact of these changes on teacher skills and content knowledge, however, is unclear.

Second, while records indicate that most Kentucky teachers are properly certified, data from a national study and from research conducted for this status report suggest that some proportion of teachers may not be as well educated at the undergraduate level in the subjects they teach as they could be. Will it be possible for teachers who in the aggregate score below national medians on academic discipline tests and who have not studied their subject areas at advanced levels in college to prepare Kentucky students to perform at high levels on state assessments? This question is difficult to answer, although it looms large when we reflect upon the study findings.

Third, although the professional development system presently in place appears to be better than the pre-KERA system, research suggests it is still not well suited to provide the types of educational services needed by many Kentucky teachers. Inasmuch as the primary means of strengthening the knowledge and skills of teachers already certified is through the professional development system, addressing that system's problems will be crucial to the improvement of the teacher workforce during the next decade.

The news about Kentucky's teacher workforce, therefore, is mixed. Kentucky teachers appear to be moving in the right direction but slowly. There are also indications of problems that, if left unaddressed, could seriously hamper the state's ability to continue improving its teacher force at an acceptable rate.

Purpose and Plan of the Report

It is appropriate for Kentuckians to consider the state of the teacher workforce for a number of reasons. Kentucky targeted its reform efforts toward improving teaching from the outset, and influential individuals and organizations at the national and state levels are examining teacher policy issues anew. Moreover, research is yielding a mounting body of evidence that good teaching matters. This report presents up-to-date information on teachers and teacher policy issues in the Commonwealth. The next chapter details some of the evidence that good teaching matters, provides additional information about attempts at the state and federal levels to improve the teacher workforce, and establishes the context for this Kentucky teacher policy review.

In chapter three, the report takes up the actual empirical data available with which to assess the quality of the teacher workforce in the state. This chapter includes not only data about teacher experience and education levels, but also about quality indicators available for students who have recently entered and exited from teacher training programs within the state. Finally and most extensively, the chapter will provide information about the apparent extent of out-of-field teaching in the state. Most inferences about teacher workforce quality in the state must be made based on these data.

Without readily available information about and interpretation of issues such as education, experience, academic training, certification, professional development, salary, supply and demand, and the like, citizens and policymakers may be unable to make the most appropriate decisions about the state's education policies.

The next chapter considers the policy issues that must be addressed by decisionmakers during coming years. Here the spotlight turns to topics such as looming retirements among veteran teachers, the teacher supply and demand outlook, teacher salaries, and teacher preparation and certification concerns. The extent to which teacher quality improves or stagnates during the next decade will depend in large part upon the decisions that are made about these issues.

The bulk of the policy recommendations offered in this report appear in the fifth and concluding chapter. The policy options offered do not represent a comprehensive catalog of changes Kentucky leaders might consider as they work to strengthen the teacher workforce during KERA's second decade. Rather, they reflect modest modifications of the current system that might yield the desired results.

A key policy recommendation concerns Kentucky's need for much better data about teachers. State education policymakers could address the data and quality problems identified in this report through a variety of means. They could authorize construction of a data system that can adequately track teachers in terms of their academic training, certification, courses taught, professional development, career advancement, evaluations, and classroom- or school-level performance. Such a system could move thoughtful Kentuckians closer to answering two questions: (1) How is classroom instruction changing as decisionmakers alter teacher training policies, state assessments, or organizational practices? And, (2) Can teacher training or teacher quality eventually be linked empirically to student outcomes, at either the district, school, or classroom levels?

A comprehensive data system on teachers would also help policymakers determine if the new performance-based teacher training and certification system is effectively preparing the next generations of Kentucky teachers. If properly constructed, the system could also assist in the establishment of a professional development system that truly meets the needs of Kentucky teachers, in terms of both their academic content knowledge and pedagogical skills.

Interspersed throughout the chapters, as well, is information about the teacher education and certification system in Kentucky and the possible effects of changes in this system on Kentucky public schooling in the next decade. Given the popular practice of "grandfathering," which typically

applies new rules and standards only to those individuals *entering* teacher preparation programs, policy changes in the teacher training and certification system can take years to yield their desired effects. It is thus crucial that changes in this system be as strategic as possible, if the teacher workforce of 2008 or 2018 is to be significantly stronger than at present.

The report concludes with three appendices, which provide additional information related to teacher workforce issues. The first includes a synopsis of the student achievement data available for Kentucky students from the past decade and a half. Student achievement levels are presumably linked to teacher quality issues, although that linkage is difficult to trace based on currently available data. The second appendix section presents pertinent details about the teacher education system within Kentucky. These institutions bear the main burden of preparing new teachers for Kentucky schools, and readers may benefit from statistical information about them. The last section recounts some recent research findings about professional development in Kentucky.

In summary, Kentucky's teacher workforce is filled with many able, competent, and caring individuals, and is in decent shape relative to teachers in other states. But Kentucky has set forth ambitious education goals for itself, and much work remains to be done to improve the teacher workforce such that the state can succeed in moving significant percentages of her students to performance levels that would make the Commonwealth a leader in the nation's social and economic life. The data and discussions in this report should help citizens and policymakers alike to think more coherently about ways to upgrade Kentucky's teacher workforce.

Photo by Rick McComb, Kentucky Department of Education

TEACHER QUALITY IN CONTEXT

Any assessment of Kentucky's teacher workforce should be placed within the context of several developments in public school research and policymaking at both the national and state levels. First, new empirical evidence is accumulating that teacher quality matters. This conviction has, of course, driven teacher policies for decades. But only in recent years have research studies honed in on the relative effects on student achievement of teacher quality. Second, as noted earlier, numerous Kentucky school reforms have targeted teacher quality, and so policymakers and members of the public should keep these reforms in mind when analyzing school reform efforts in the Commonwealth. And third, new attention at the national level has been given to matters of teacher quality. Inasmuch as Kentucky participates in this national dialogue about improving its teacher workforce, it could benefit from ideas promoted by those in other states to improve its teacher workforce. Information about developments in these areas forms the context for this report.

The Importance of Teacher Quality

Though the notion that good teaching leads to better student achievement is commonsensical, until recently few social science studies firmly established and quantified this linkage. The empirical evidence about the effects of teacher quality has recently been marshaled and disseminated by the National Commission on Teaching and America's Future (NCTAF). Headquartered at Columbia University's Teachers College, NCTAF's primary policy focus has been to encourage teacher improvements through increased regulation of the certification system, and through control of profession governance bodies by classroom teachers themselves.

As social research has repeatedly demonstrated, the socioeconomic status of children's parents has the greatest impact on their achievement levels. This study reaffirms that perennial conclusion but finds teacher quality is only slightly less influential in its impact on achievement.

Toward that end, NCTAF released an influential report in 1996 recommending that new professional standards be set for teachers and their training, that professional development be improved, that better recruiting and hiring practices be adopted, that teacher knowledge and skills be rewarded, and that schools be redesigned so they are better organized for student and teacher success.[1] Incidentally, a dozen states, including Kentucky, have been auditing their own policies for NCTAF to determine how closely they reflect the Commission's recommendations.

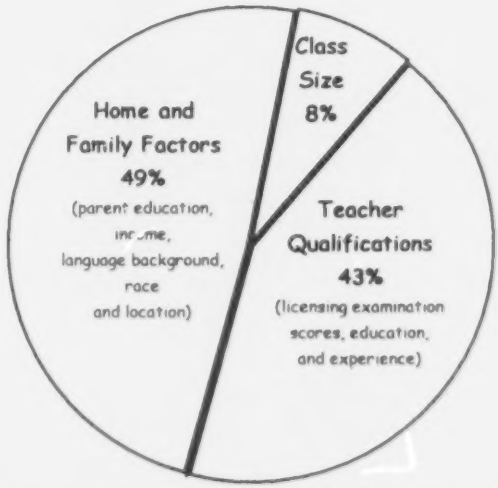
A 1997 NCTAF publication summarizes evidence about the effects of teacher quality. Among the more prominent studies cited was an examination of 900 school districts in Texas. The author of that study ". . . found that teachers' expertise—as measured by scores on a licensing examination, master's degrees, and experience—accounted for about 40 percent of the measured variance in stu-

[1] National Commission on Teaching and America's Future, *What Matters Most: Teaching for America's Future* (New York: Author, 1996).

dents' reading and mathematics achievement" at several grade levels.[2] Figure 1 recounts some additional findings from this study. As social research has repeatedly demonstrated, the socioeconomic status of children's parents has the greatest influence on achievement levels. This study reaffirms that perennial conclusion but finds teacher quality is only slightly less influential in terms of impact on achievement. Reduced class size, on the other hand, accounts for only a small amount of the variation in student performance.

FIGURE 1

Influence of Teacher Qualifications on Student Achievement, Proportion of Explained Variance in Math Test Score Gains, Grades 3 to 5, Due to:


Class Size 8%
Home and Family Factors 49%
(parent education, income, language background, race and location)
Teacher Qualifications 43%
(licensing examination scores, education, and experience)

Source: National Commission for Teaching and America's Future, *Doing What Matters Most: Investing in Quality Teaching*, 1997, p. 9.

The Commission cites similar studies of school systems in Tennessee and Alabama as well as some national studies that also show significant, quantifiable impact of higher quality teachers on student achievement, at least as quality is reflected by licensing exam scores, master's degrees, and experience levels.[3] These studies establish the strong correlation between teacher quality and student performance, although in addition they show that other factors in students' lives powerfully influence academic performance as well. Such evidence, though, lends credence to the growing attention being given to the knowledge and skill levels of those in the teacher workforce.

[2] Based on data presented in Ronald F. Ferguson, "Paying for Public Education: New Evidence on How and Why Money Matters," *Harvard Journal of Legislation* 28 Summer (1991). The Ferguson study findings on teacher qualifications were, in turn, presented in Linda Darling-Hammond, "Unequal Opportunity: Race and Education," *The Brookings Review* Spring 1998: 28-32.

[3] See, for example, Ronald F. Ferguson and Helen F. Ladd, "How and Why Money Matters: An Analysis of Alabama Schools," in Helen Ladd, ed., *Holding Schools Accountable* (Washington, D.C.: Brookings Institution, 1996) 265-298; William L. Sanders and June C. Rivers, *Cumulative and Residual Effects of Teachers on Future Student Academic Achievement* (Knoxville: University of Tennessee Value-Added Research and Assessment Center, 1996).

Kentucky School Reform and Kentucky Teachers

An important part of this study's context involves KERA, which was approved by the General Assembly in 1990. This landmark legislation reformulated the Commonwealth's entire education code and sought to move the public school system from a focus on inputs—teacher-pupil ratios, number of books in the library, minutes per week spent on math, and the like—to a focus on outputs, specifically student performance and school accountability. Kentucky's school reform approach reflected the policy prescriptions of many national education policy organizations at the time.

Though KERA has garnered much attention within the state and nationally, the 1990 reform act did not signify the *beginning* of serious education improvement efforts in Kentucky. Indeed, as noted earlier, some policymakers within the state had been working for years to upgrade Kentucky's public schools. By the early 1980s, various education committees of the General Assembly became more involved in education policy and budget decisions, as did the Prichard Committee and sundry other public school advocacy groups. State education policy leaders spent the bulk of the 1980s addressing deficiencies in the system. These efforts led to school improvement legislation in 1984, 1985, and 1986, components of which focused on teachers. For example, in 1984 Kentucky was one of the first states to approve a first-year teacher internship program to help new teachers adjust to the classroom. Similarly, new mechanisms for evaluating Kentucky teachers have been developed since the mid-1980s. In a sense, these efforts culminated in the 1989 Kentucky Supreme Court ruling that the entire common school system was unconstitutional, and in passage the next March of KERA. Viewed from this perspective, KERA represented consolidation and augmentation of previous policies, not a dramatic break with past policy.

For much of the past eight years, public discussion of school reform has focused on KERA implementation issues and the extent to which school communities have adjusted to the new policies that took effect fully in 1996. Public discourse about school reform has hence been about such things as the effectiveness of local school councils, the Kentucky Instructional Results Information System (KIRIS) accountability testing system, district school board decisionmaking, and the new reading or math curriculum that might have been chosen for the elementary school at the end of the street. Kentucky schools and communities are thus well into what might be called the KERA era. No longer do citizens debate whether school change and improvement should take place. Rather, they discuss *how* reform should proceed and how KERA should be tweaked so as to function more effectively.

Kentucky policymakers understood in 1990 that if children are to reach the higher levels of achievement stipulated by KERA, then teachers must become significantly more adept at their craft and reach new levels of performance.

What many ordinary Kentuckians may have missed about the state's school reform efforts amid the acronyms and the widespread attention to student testing results is that significant portions of KERA—and of pre-KERA reforms as well—are about improving teaching in Commonwealth classrooms. Kentucky policymakers understood in 1990 that if children are to reach the higher levels of achievement stipulated by KERA, then teachers must become significantly more adept at their craft and reach new levels of performance.

Arguably, the bulk of KERA's changes target teachers and teaching. The creation of a core curriculum linked to KIRIS assessments, for example, was meant to guide teachers about what students should know and be able to do, not simply represent a slight improvement over the previously used standardized test system. Similarly, school councils, which must make key decisions about curriculum, personnel, and school direction, are dominated by teachers. Hence, individuals with the greatest personal stake in classroom matters play the largest role in setting site-level policies.

Teachers were also given effective control over the Education Professional Standards Board (EPSB), an entity created by KERA to govern teacher preparation and certification matters in the Commonwealth. The idea here was that classroom teachers, not Kentucky Department of Education

(KDE) bureaucrats or education professors, should make important decisions affecting members of the teaching profession. Strictly speaking, therefore, since the early 1990s a teacher-dominated board has played a crucial role in altering teacher certification and preparation policies to meet the strictures of the 1990 reform act.

Through at least two additional means, KERA recognized the pivotal position of teachers and teaching in the reform scheme. The legislation included significant pay raises for teachers during the first years of implementation to help make up for salary erosion during the latter 1980s and to make the profession more attractive to both talented potential recruits and skilled instructors already in the classroom. Indeed, the presumption was that as greater remuneration and increased responsibilities and accountability flowed to teachers, the respect for them and their profession would increase.

KERA also significantly increased the amount of state money devoted to professional development, in recognition of the fact that teachers would need assistance in adjusting to new expectations and procedures. The legislature also made more time available for teacher training during the first few years of reform implementation by allowing districts to replace up to five instructional days with professional development days. Not only would more revenue and time be available for such activities, but also teachers, through school councils, would decide what types of professional development programs to undertake at a given school. No longer would teachers be forced to choose only among options arranged for them by districts or KDE (although districts would still be able to provide some professional development options themselves).

Through these and sundry other means, according to the logic of KERA, Kentucky teachers would become adequately equipped to move children to ever higher levels of achievement. In addition, able, caring, and inspirational women and men would be drawn into the profession or would remain in it past retirement eligibility, and hence ensure a workforce of gifted teachers for years to come.

Given that buttressing the teaching force in Kentucky has been at the heart of school reform efforts for well over a decade and has been integral to Kentucky's much lauded, massive systemic education reform program since 1990, it is fitting to ask what evidence is available about the teaching force in Kentucky, in terms of education, experience, academic training, professional development, salary levels, and the like, that might allow citizens and policy leaders to make judgments about the strengths and weaknesses of this most crucial cadre of individuals.

National and State Attention on Teacher Workforce Issues

Another feature of the teacher workforce context is that the national spotlight has again moved to issues of teacher knowledge and skill levels. Teacher competence received considerable attention during the educational "excellence movement" of the 1980s, out of which KERA emerged. Raising standards for teachers was a key recommendation of *A Nation at Risk*, the 1983 report that helped spur a wave of state-level reforms. Later in the decade, two influential national reports on teacher training—*Tomorrow's Teachers*, produced by an assemblage of education school deans called The Holmes Group, and *A Nation Prepared: Teachers for the 21st Century*, issued by the Carnegie Forum on Education and the Economy—appeared.[4]

Both of these latter documents urged, among other things, that prospective teachers receive broader and deeper liberal arts training at the undergraduate level and that much pedagogical instruction be moved to the graduate or fifth year level; that higher minimum standards be established for entry into the profession; that different categories of teachers be developed to recognize superior teaching skills and competencies; that teachers be freed from regulations that hamper creativity and professional judgment; and that schools become better environments for teachers to work in. In Kentucky, the Prichard Committee's influential reform manifesto, *The Path to a Larger Life*, contained many of these same ideas. These and other recommendations regarding teacher preparation and certi-

[4] The Holmes Group, *Tomorrow's Teachers* (Lansing, Michigan: Author, 1986); Task Force on Teaching as a Profession, The Carnegie Forum on Education and the Economy, *A Nation Prepared: Teachers for the 21st Century* (New York: Author, 1986). It is noteworthy that the UK College of Education was a member institution of the original Holmes Group.

fication became important parts of national and state level education reform agendas during the latter 1980s and early 1990s.

Over a decade later, teacher workforce issues have again come to the fore, drawing attention from various sources, most prominently NCTAF, the Commission cited earlier. In addition to identifying studies that show the effects of teacher quality on achievement, NCTAF has also been highlighting the problem of "out-of-field" teaching, which arises when certified teachers—primarily at the middle and high school levels—teach in academic fields in which they have received only modest undergraduate training. The National Commission found evidence, for example, that almost a quarter of high school teachers have not earned at least a college minor in the main field in which they teach, and the figure rises to 30 percent for mathematics teachers.[5]

These and other data strongly suggest that students in American schools are often taught by instructors who may be caring and competent in pedagogical skills, but not well versed in the subject matter they teach. The data also suggest the problem is considerably worse in some places than in others. It ought to be useful, therefore, to determine the extent of this problem in Kentucky, inasmuch as this is possible, and its effect on student achievement.

The quality of teacher trainees has been an ongoing concern of state lawmakers, and teacher preparation and certification may become more salient as federal and state governments resume the push for improved student performance.

Both national teacher unions have also been developing strategies to upgrade teacher knowledge and skill levels. Though it is unclear what specific initiatives the National Education Association (NEA) and the American Federation of Teachers (AFT) will undertake, both organizations have been reorganizing themselves or launching programs to focus on teacher quality.[6] In addition, Education Secretary Richard Riley has recently made teacher quality issues a focus of speeches and has promoted Education Department publications on the improvement of teacher quality.[7]

Teacher quality has also entered national political discussions indirectly, through President Clinton's proposal to spend federal dollars to help the states hire 100,000 new teachers over the next few years to reduce the number of students in the nation's classrooms. After much rancorous debate, this proposal passed congressional muster shortly before the 1998 fall election, with bipartisan support. Though Congress only approved a little over $1 billion for fiscal year 1999 for the class-size reduction program, it is estimated that Washington will have to spend at least $12 billion over several years to hire enough teachers to reach the Administration's goals. Moreover, the proposal contains many costs that the states will have to bear. Given the apparent political support for this policy approach, however, many voters must believe class size reduction is a credible and workable approach to ensuring that students get enough attention from their teachers.

Moreover, class size reduction is a policy that Kentucky lawmakers themselves have embraced in the past.[8] Yet KERA gave school councils the right to decide class size policies at individual schools. It is unclear how class size reduction mandates would mesh with KERA's decisionmaking structure. In addition, matters of teacher training and credentialing will clearly also come into play as Kentucky seeks to receive the estimated $19 million it would likely be allocated under the plan in fiscal 1999 to hire new teachers.[9]

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[5] *What Matters Most* 15.

[6] Ann Bradley, "NEA, AFT Strategies for Upgrading Quality of Teachers Drawing Nearer," *Education Week* 23 Sept. 1998; Ann Bradley, "NEA, AFT Take Up the Thorny Issue of Teacher Quality," *Education Week* 7 Oct. 1998.

[7] See, for example, information about "Promising Practices: New Ways to Improve Teacher Quality," available at the U.S. Education Department's web site at: www.ed.gov.

[8] For example, class size reduction was a key component of House Bill (HB) 6, the education reform legislation produced during the summer 1985 special session of the General Assembly. The class size targets set by HB 6 were never met, however, because the legislature did not appropriate enough revenue to hire the additional teachers necessary to implement the policy.

[9] Estimated state expenditures supplied by the U.S. Department of Education and cited in Debra Viadero, "Small Classes: Popular, But Still Unproven," *Education Week* 18 Feb. 1998.

There is also evidence that teacher quality issues will play an increasingly large role in both southern regional and Kentucky politics and education policy. The Southern Regional Education Board (SREB), for example, in two recent publications—*Educational Benchmarks 1998*, and *Improving Teaching in the Middle Grades: Higher Standards for Students Aren't Enough*—also chose to focus attention on out-of-field teaching and other issues associated with preparing a strong teacher workforce.[10] In the Commonwealth, the state's major newspapers have published articles recently about teacher quality and preparation levels.[11] In addition, the Prichard Committee has agreed to work with teacher policy officials at the Education Professional Standards Board and around the state on an effort to upgrade the teacher profession. And the Commissioner of Education has issued his own plan to improve teacher knowledge and skill levels.

As if to reinforce the point that teacher quality is high on the public agenda, in late 1998 a poll was released that showed that teacher quality was the second highest educational priority—behind only school safety—among the national sample of citizens polled. According to a report entitled "The Essential Profession," which included the poll results, nine out of ten of those sampled rated placing well-qualified teachers in classrooms as more important than beefing up the curriculum, enhancing classroom discipline, or reducing class size.[12]

Photo by Rick McComb, Kentucky Department of Education

And finally, at press time the National Center for Education Statistics (NCES) released a publication entitled *Teacher Quality: A Report on the Preparation and Qualifications of Public School Teachers.*[13] In remarks made as this report was released, NCES Commissioner Pascal Forgione recognized the heightened concern about the need for excellent teachers, and indicated that his organization would be offering biannual reports on teacher quality.

From the standpoint of interest in teacher quality issues at the national, regional, and state levels, therefore, this is an opportune moment to examine the status of Kentucky's teacher workforce. The National Commission and others have focused new attention on issues of teacher training and certification, in the hope of prompting dialogue about and scrutiny of teacher policies in states around the country. Moreover, the quality of teacher trainees has been an ongoing concern of state lawmakers, and teacher preparation and certification may become more salient as federal and state governments resume the push for improved student performance.

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[10] The SREB determined, for example, that member states (including Kentucky) were doing poorly on four of six teacher education areas. In short, says the *Benchmarks* report, "Too many teachers have inadequate backgrounds in the subjects they teach." P. 49 Southern Regional Education Board, *Educational Benchmarks 1998* (Atlanta: SREB, 1998).

[11] See, for example, Bill Bishop, "Teacher Education Part of the Cycle of Mediocrity," *Lexington Herald-Leader* 12 Aug. 1998; see also Lonnie Harp, "KERA Task Demands Change in Teaching, Culture," *The Courier-Journal* 8 Dec. 1997; see also "The Learning Gap," *Lexington Herald-Leader* 15 Nov. 1998.

[12] Jeff Archer, "Public Prefers Competent Teachers to Other Reforms, Survey Finds," *Education Week* 25 Nov. 1998.

[13] Statistical Analysis Report, January 1999, NCES 1999-080, U.S. Department of Education, Office of Educational Research and Improvement.

INDICATORS OF TEACHER QUALITY

A question at the heart of this report is: Based on the best available evidence, what can be said about the quality of the teacher workforce in Kentucky? Having reviewed a variety of different kinds of data—"hard" and "soft"—we conclude that this question deserves a two-part answer. The first part flows from an analysis of the empirical information that currently exists and that touches upon teacher quality issues. These data are mixed, some showing positive aspects of the teacher workforce, and some less than positive. The second part is broader and relates more generally to the limitations of the available data. In short, while certain information is available about teachers in Kentucky, much remains unknown about these most influential individuals. Until a stronger base of data can be amassed, it will be difficult to know with precision what weaknesses exist within the teaching force and what might be the best policy mechanisms for addressing those weaknesses.

In what follows, the extant information about teacher quality in the state is discussed and inferences drawn. Interlaced throughout this discussion are reflections about data limitations and what could be gleaned about teaching and learning in the Commonwealth if an adequate teacher data system were constructed over the next few years.

The positive data include information about teachers' experience and education and the achievement of those studying to be teachers. The less-than-happy news involves the number of teachers who are teaching subjects outside their primary area of academic expertise—the so-called "out-of-field teaching" problem.

What the Data Say about Teacher Quality in Kentucky

To an extent, quality depends on the metric, and by some metrics, Kentucky teachers are doing well. For example, in the previously cited 1997 report *Doing What Matters Most*, NCTAF rated the Kentucky teacher workforce highly. Based on NCTAF's indicators, Kentucky received a score of 5, which was matched by Ohio. Only three states—Minnesota, Iowa, and North Carolina—outscored the Commonwealth in this report.

The weekly trade-press publication *Education Week* has begun assembling state-level education indicators and publishing them annually. In last year's edition, entitled *Quality Counts '98*, Kentucky won plaudits for its teacher preparation and certification system. According to this report, Kentucky earned a grade of 87 out of 100, or a B+, and was surpassed in score only by Oklahoma and Connecticut.[14] As of press time, *Quality Counts '99* had just been released. Again Kentucky achieved a B+, this time with a grade of 89, although a somewhat different array of indicators was used.

While these reports offer good news to Kentuckians, the indicators used in these analyses were heavily weighted toward measures that involve a variety of regulatory, program, or input measures, rather than "output" measures of what teachers know and what they can do in the classroom.[15] For example, the *Quality Counts* study rewarded Kentucky highly because of its certification procedures.

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[14] Education Week, *Quality Counts '98: The Urban Challenge, Public Education in the 50 States*. Special Issue of *Education Week* 8 Jan. 1998: 82-83.

[15] See "Appendix A: State-by-State Report Card, Indicators of Attention to Teaching Quality, October 1997," in *Doing What Matters Most*. For example, ratings included figures on teachers as a percent of total staff, the percent of teacher training programs certified by a national certification body, and the percent of teachers who received more than eight hours of professional development in the previous year.

the way it governs teaching, and its support for professional development. But the document provides no empirical evidence about teacher knowledge and skill levels. Rather, these are implied based on inputs and processes. Whether such inputs and processes indeed produce high-quality teachers is an issue about which there is considerable dispute.

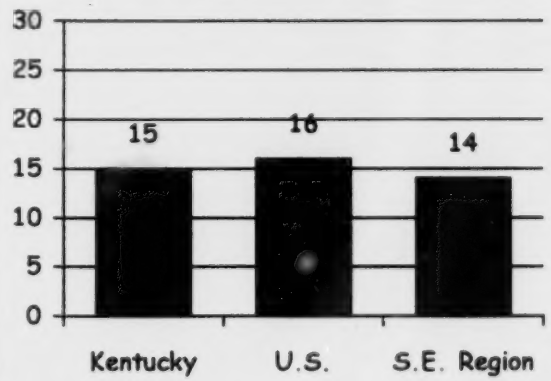
Inasmuch as Kentucky has been reconstructing its elementary and secondary school system around achievement goals and indicators of student progress toward those goals, as well as accountability at the school level, it seemed more appropriate for the purposes of this report to focus on outcomes indicators for the teacher workforce. The material below will therefore focus on a somewhat different set of data than the NCTAF or *Education Week* reports. In spite of significant limitations in available information about teacher quality, it is possible to draw some conclusions about the teacher workforce.

Teacher Experience Levels

In terms of positive indicators, it appears that teachers in Kentucky have about as much classroom experience as teachers elsewhere in the nation and in the southeast region. As Figure 2 shows, Kentucky teachers have spent on average 15 years in the classroom, which is one year behind the nation as a whole, but one year longer than their counterparts elsewhere in the southeast region.

FIGURE 2

Average Years of Teaching Experience, U.S., KY, and Regional Comparisons, 1997



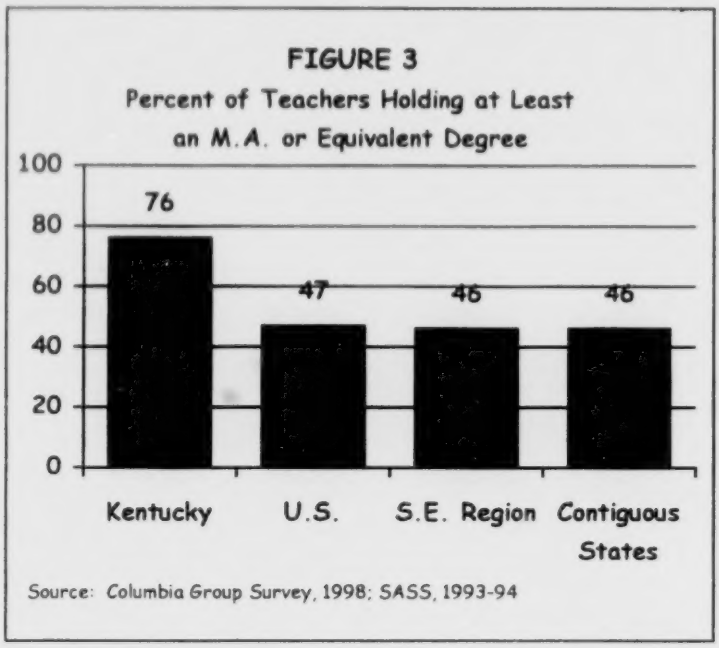
Source: Teachers Teaching in the Southeast: A Special Columbia Group Report, 1998

While no *necessary* correlation exists between teacher quality and years of experience, many who study teacher quality issues argue that time in the classroom indeed relates to teacher competency. Teacher unions have argued as much for many years, and the teacher rank and pay scale reflects the belief that those with more experience are "worth" more to schools and communities than those with less. Presuming, therefore, a link does exist between years of experience and teacher quality, then it appears that Kentucky teachers compare well with those elsewhere.

Teacher Education Levels

Another indicator of teacher quality involves the amount of postbaccalaureate academic work that teachers have undertaken. Here teachers in Kentucky appear to be significantly ahead of those elsewhere. As Figure 3 shows, slightly over three quarters of all teachers in Kentucky hold degrees at

the master's level, whereas slightly less than half of teachers elsewhere do so. This is due in large measure to a 1967 teacher certification regulation that obliged all teachers in the state to obtain a master's degree within 10 years of beginning a teaching job in Kentucky or risk losing their certification. It has also been nearly impossible to reach Rank I status without a master's degree or its equivalent. Hence, the incentive structure within the public school system heavily favors continuous graduate work by teachers through the master's level.



It is noteworthy that state-to-state variation in graduate training is significant and appears to be related to regulatory requirements but not necessarily academic achievement levels of students. For example, the three states that outscored Kentucky in NCTAF's 1997 teacher quality survey cited earlier each had considerably lower percentages of teachers with a master's degree or higher: Minnesota (36.7 percent); Iowa (32.6 percent); and North Carolina (36.4 percent). These states' students also outscore Kentucky students on most national standardized tests. It would follow that while high graduate attainment *may* be a useful indicator of quality, it is not always or necessarily so. Skepticism about the value of master's degrees has fueled various efforts to do away with this requirement in Kentucky.

Achievement Levels of Recent Kentucky Teacher Education Students

In recent years, and as a result of numerous changes in the teacher training system, KDE has begun gathering various achievement data on teacher education students in the state. Based on some of these data, it appears that students *entering* Kentucky's colleges or departments of education are "above the average" of all college entrants statewide, both in terms of ACT scores and GPA levels.

As Table 1 shows, between 1992 and 1996, the typical teacher trainee in Kentucky scored around 21.5 on the ACT college admissions test. This score is better than the national average for all ACT test takers, which drifted from 20.7 to 20.9 during this time span, and for Kentucky ACT examinees, who have scored at 20.1 over a number of years. Hence, those who aspire to be trained to teach in Kentucky schools, or schools elsewhere, appear to be "above average" by this measure. It is noteworthy, as well, that these students also carry GPAs above 3.0, even though the minimum acceptable score for entering these institutions is 2.5.

This achievement bodes well for the basic competence of recent entrants into Kentucky's teacher workforce. It would be cause for more optimism, of course, if ACT averages of teacher trainees from these institutions had been closer to 23 or 24.[16] On the other hand, no studies exist that link teacher competency to minimum scores on tests such as the ACT. We take it to be a good sign, however, that would-be teachers are coming from among the cohort of students who score at the 21-22 level, rather than at the statewide average.

TABLE 1
Standardized Test Scores of Recent Kentucky Teacher Education Students (Statewide Report of Average ACT Scores, Grade Point Average [GPA], and Cumulative Hours by Admission Status for 1992-1996)

	1992-93	1993-94	1994-95	1995-96
Students Admitted to Teacher Training Programs				
ACT Enhanced	21.4 (1142)	21.7 (1243)	21.1 (1489)	21.6 (1467)
GPA	3.10 (3195)	3.10 (2510)	3.09 (2579)	3.14 (2241)
Conditional Admission				
ACT Enhanced	21.5 (110)	21.0 (100)	22.7 (341)	22.9 (342)
GPA	3.09 (267)	N/A	3.02 (276)	3.01 (190)
Denied				
ACT Enhanced	19.4 (282)	19.4 (468)	19.6 (785)	19.8 (824)
GPA	2.62 (962)	2.63 (1144)	2.69 (1156)	2.94 (1143)
Kentucky Average, ACT Enhanced	20.1	20.1	20.1	20.1
National Average, ACT Enhanced	20.7	20.8	20.8	20.9

Note: Individual cell values are not additive. Incomplete data reported by some institutions. Numbers in parentheses represent number of students.
Source: Table E-1, *Kentucky's Performance Indicators for Teacher Education Programs, 1992 Through 1996*. KDE, OTEC, January 1997.

Students Completing Teacher Training Programs

Teacher education students in Kentucky prepared to teach in certain subjects fare better than others compared with graduates of other teacher training programs around the country. This is the case at least as based on score results from national teacher examinations. According to data collected from Kentucky's 26 teacher training institutions for 1993-94 and 1994-95 by Kentucky's Office of Teacher Education and Certification (OTEC), for example, as shown in Table 2, graduates of Kentucky teacher preparation programs score at the national average on the three "core" knowledge and skill batteries of the Praxis II exam (the new name for the old National Teachers Examination). They score at or slightly above the national average in several categories, including biology and general science; math; physical, business, and music education; and educational leadership, administration, and supervision. But in a dozen other disciplinary areas, Kentucky teacher training graduates seeking certificates scored below the national median scores on the Praxis subject area exams, at least during 1993-94 and 1994-95. Note that in Table 2 the shaded lines show the subject matter areas in which the Kentucky median score was below the national median score.

[16] In fact, ACT score averages *are* at this level at several Kentucky teacher training institutions, including (in 1995-96) Asbury College (23.1); Centre College (25.9); Georgetown College (23.9); Alice Lloyd College (23.5); Transylvania University (24.5); and Western Kentucky University (24.0).

TABLE 2
Beginning Teacher Performance, General, and Subject Area Examinations, Praxis II Exam Results, KY and U.S., 1993-94 and 1994-95

	1993-94		1994-95	
SUBJECT AREA	KY MEDIAN	US MEDIAN	KY MEDIAN	US MEDIAN
Education in the Elem.	630	640	630	640
Early Childhood Educ.	640	660	640	660
Biology and Gen. Science	660	660	665	650
Eng. Language and Lit.	600	610	580	610
Technology Education	630	660	650	660
Mathematics	620	600	610	600
Chem., Physics, Gen. Sci.	590	600	570	590
Social Studies	590	610	590	610
Physical Education	620	630	630	630
Business Education	650	640	640	640
Music Education	620	620	620	620
Home Econ. Education	640	660	650	660
Art Education	590	620	600	620
French	585	620	580	620
Spanish	560	600	550	600
Library Media Specialist	660	670	650	660
Special Education	620	630	610	630
Ed Lead. Admin. & Super.	700	670	680	670
Communication Skills	663	662	662	662
General Knowledge	659	658	658	659
Professional Knowledge	662	662	662	662

Source: *Kentucky's Performance Indicators for Teacher Education Programs, 1992 Through 1996* KDE, OTEC, January 1997. Section II, 1996-97 scores from OTEC compilation. Shaded lines show areas in which Kentucky student scores fell below national medians in both years.

OTEC has recently compiled the Praxis II scores of Kentucky students on the 1996-97 round of the test, shown in Table 3. The new tests cannot be easily compared with the previous versions because a greater number of subject area tests were administered and new score scales were developed in a number of subject areas. However, the newer Praxis numbers still show Kentucky students lagging behind national averages in many subject categories, though still scoring quite close to the national norm in the core battery areas (shown on the bottom three rows of Table 3). It is noteworthy, we should add, that a process is in place to review the passing scores that have been set, so there may be fluctuation in these discipline-area scores and failure percentages over the coming years. Fluctuation also occurs due to the small numbers of students taking some of the subject area exams.

Taken together, these various Praxis data suggest that above-average students in preparation programs and certain disciplines might not be receiving rigorous enough instruction during the latter part of their postsecondary school careers. This is *not* primarily or necessarily a problem for departments or colleges of education, but instead raises a host of institution-wide issues. The problem *has* indeed been recognized, and numerous colleges and universities have moved to address it. Both the University of Kentucky and the University of Louisville, for example, have established degree and certification programs that transfer most pedagogy instruction into a fifth year. This allows undergraduates to major and minor in academic subject areas, and study teaching methods and materials primarily at the graduate level. But it will be some time before it becomes clear if these strategies will suffice.

TABLE 3
1996-97 Praxis II Subject Area Exam Results, Kentucky Test Takers

SUBJECT AREA	KY Median	KY Passing Score	US Median	US % Below KY Median	Total # of KY Failures	Total # of KY Students	% of KY Failures
Education in the Elementary	630	510	630	3.3	6	825	0.7
Elementary Education	178	143	179	3.6	0	56	0.0
Early Childhood Education	630	480	650	2.1	16	1269	1.3
English Language & Literature	520	510	590	14.7	4	32	12.5
English Lang., Lit. & Comp.	175	138	177	2.0	3	258	1.2
English Lang. Lit Comp Essays	153	135	160	2.5	13	266	4.9
Technology Education	605	570	660	7.5	0	14	0.0
Mathematics	620	500	600	8.1	0	32	0.0
Math Content Knowledge	142	141	137	54.5	62	163	38
Social Studies	545	500	600	18.3	10	43	23.3
Soc. Studies: Content Knowledge	162	146	168	9.3	35	299	11.7
Soc. Studies: Interp. of Materials	161	150	166	11.0	38	300	12.7
Physical Education	625	540	620	9.1	2	17	11.8
Phys. Educ.: Content Knowledge	155	152	154	12.3	46	143	32.2
Business Education	630	570	630	39.4	4	79	5.1
Music Education	620	510	620	3.5	3	115	2.6
Home Economics Education	600	540	650	8.9	2	22	9
Art Education	630	510	620	8.8	6	75	8
French	575	510	610	14.7	2	25	8
German	515	490	590	16.9	5	10	50
Spanish: Content Knowledge	163	145	176	9.3	8	61	13.1
Spanish: Productive Lang. Skills	152	156	173	20.9	25	156	16
Biology: Content Knowledge, 1	165	139	167	5.5	1	112	0.9
Biology: Content Essays	146	139	151	16.4	19	115	16.5
Chemistry: Content Knowledge	151	144	150	38.7	11	57	19.3
Physics: Content Knowledge	139	141	122	73.3	13	25	52
Library Media Specialist	670	590	670	10.7	3	111	2.7
Speech Language Pathology	660	450	670	1.0	0	108	0.0
Special Education	610	500	620	7.9	22	390	5.6
Special Educ. Core Principles	152	127	156	1.4	0	17	0.0
Special Educ. Emotional Dist.	161	147	164	9.1	1	10	10
School Psychology	700	630	700	19.8	1	44	2.3
Ed Leadership, Admin., & Super.	700	540	680	6.6	6	311	1.9
Gen. Science Content Knowledge	163	150	158	28.5	10	82	12.2
Health Education	675	550	710	3.3	0	10	0.0
Communication Skills	661	646	662	11.8	219	3978	5.5
General Knowledge	657	643	657	13.2	260	4038	6.4
Professional Knowledge	662	644	663	6.5	98	3374	2.9

Source: Office of Teacher Education and Certification, KDE, Summer 1998. Shaded rows show areas in which Kentucky students scored below the national median.

The Kentucky teacher workforce, therefore, looks good from the standpoint of experience levels and extent of graduate coursework completed. It also appears that those who have entered teaching in recent years have above average college entrance exam scores, perform close to national averages on core areas of the Praxis exam, and fluctuate above and below the national medians on various Praxis subject area tests. Some of these findings represent good news about the Kentucky teacher workforce, and some can be construed as at least neutral. Others suggest areas where attention is needed.

The Not-So-Good News: The Uncertain Dimensions of "Out-of-Field" Teaching

The more troubling information regarding the teacher workforce in the state involves the apparent high incidence of so-called out-of-field teaching. As noted earlier, NCTAF deems a teacher to be teaching out of field when that person provides instruction at the middle- or high-school level in subjects in which he or she possesses neither a college major nor minor. The logic here is rather straightforward. It is assumed that to teach academic discipline well, an individual must have studied that topic at a level more than one or two steps beyond what must be taught. A relatively simple benchmark for how much study is "enough" has for years been study at the level of at least a college minor. Hence, for example, a high school history class ought not be taught by someone whose college major was psychology and minor was Spanish.

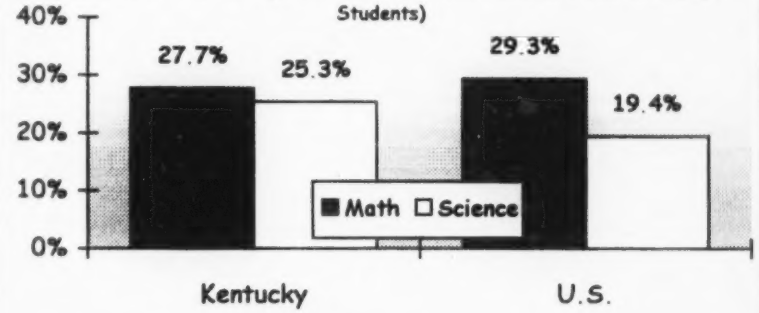
Based on data supplied by NCTAF and using this definition, it appears that out-of-field teaching is a significant problem nationwide. NCTAF has drawn the conclusion primarily from data gathered in 1993-94 by the National Center for Education Statistics (NCES) through its Schools and Staffing Survey (SASS). During the 1993-94 school year, NCES sent tens of thousands of surveys to school personnel around the country and gathered information about staffing practices at those schools. Most states returned enough samples of surveys to provide state-by-state results.

NCTAF was particularly concerned about the academic preparation of middle and high school math and science teachers, these disciplines being deemed crucial for the nation's economic competitiveness. According to analyses of SASS data, and as Figure 4 shows, out-of-field teaching in math and science is clearly a problem at the national level and in Kentucky.

FIGURE 4

Out-of-Field Teaching, Math and Science, Grades 7-12, 1993-94

Percentage of Public School Teachers Teaching at Least One Course in Math or Science without a Major or Minor in Those Fields (Schools with 600+ Students)



Source: NCES, 1993-94 Schools and Staffing

These results indicate that over a quarter of those teaching math and science in Kentucky in grades 7-12 was not sufficiently prepared at the undergraduate level to provide instruction in those disciplines, at least as of 1993-94. The percentages for Kentucky are slightly better than the national averages in math, but somewhat worse in science. It is possible, however, that the findings in Figure 4 regarding Kentucky are not representative of schools statewide. These findings are based on information from schools of 600 students or more. Since many Kentucky middle schools, and even some high schools, are not this large, a considerable number of schools were bypassed. It is unclear how this sampling method skews the data.

A different—and likely better—look at out-of-field teaching in high schools across the country, again relying upon the 1993-94 SASS data, reveals the variation in this problem from subject area to subject area. As Table 4 shows, in Kentucky this problem is acute in math and English as well as physical science and history. Although in certain disciplines Kentucky apparently has less out-of-field teaching than nationally and in the states contiguous to the Commonwealth, these numbers are not encouraging.[17]

TABLE 4
Percentage of Public High School Teachers, Grades 9-12, w/Less Than a Minor in the Field They Teach

	Math	Science	Social Studies	English	Foreign Language	Voc. Ed.	Art/ Music	Phys. Ed.	Life Sciences	Physical Sciences	History
KY	28.3	15.9	17.0	27.2	—	21.7	18.5	—	—	40.1	30.9
US	28.1	18.2	17.8	21.5	13.7	18.0	20.4	14.6	31.2	54.7	51.8
Contiguous States*	25.7	19.2	19.6	20.0	10.7	17.2	24.4	11.9	37.9	50.4	61.1

** NOTE: These figures represent a simple average rather than a weighted average*
Source: 1993-94 SASS Study, compiled from tables published in Doing What Matters Most

What is unclear about this problem in Kentucky, however, is the extent to which the 1993-94 SASS study results accurately reflect the amount of out-of-field teaching taking place. KDE representatives disagree with the SASS figures on out-of-field teaching in this state. But KDE does not have a firm database with which to refute these figures, because the Department calculates teacher qualifications in a different manner.

The disjunction between the SASS study and KDE's claims rests largely upon the distinction between whether individuals are appropriately *certified* to teach or whether they are *qualified* to teach based on having at least a minor in their primary teaching field. According to KDE records, for example, only a miniscule percentage of teachers in Kentucky are teaching in an area for which they are uncertified. Indeed, Kentucky takes pride in having properly certified teachers in virtually every classroom in the state.

But the certification system in Kentucky allows instruction to be given in some cases by those who have not attained a major or minor in the academic subject they are teaching. This is the result of fairly recent changes in the way schools are organized and in expectations regarding teacher preparation. Historically, Kentucky schools were broken into K-8 and 9-12 grade levels. Those wishing to teach at the K-8 level were trained as generalists rather than specialists, and given K-8 or elementary certification. In recent years, though, 6-8 grade students in Kentucky have increasingly been moved to middle schools, and teachers with the earlier elementary certification have been allowed to continue providing instruction.

The EPSB has recognized the need for middle school teachers to receive more academic training in the subjects they teach, and has increased coursework requirements for new middle school teachers. However, this leaves a portion of middle school teachers legally certified to teach but, by NCTAF's definition, teaching out of field.

Unfortunately, there is currently no reliable way for KDE officials or outside researchers to verify the extent of out-of-field teaching at either the middle- or high-school level in the Commonwealth. KDE maintains an electronic database on teachers in the state, which contains copious information for each teacher, including the certifications they possess and codes of the courses they teach. However, this database does *not* contain information about the coursework teachers have completed at the undergraduate or graduate level, or subject area test scores from Praxis exams. Hence, KDE can crosscheck teacher certifications with courses taught and determine, for example, that few teachers are uncertified to teach their courses. But it cannot correlate courses taught with the amount of post-

[17] The SREB study cited on page 10 reported similar out-of-field teaching percentages for southeastern states, based on different analyses of the same 1993-94 data set. See page 51 in *Educational Benchmarks*.

secondary training teachers have received in various subject areas or with the professional development work they may have accumulated in disciplinary studies.

As a result, SASS results indicate potentially serious problems with teacher academic preparation levels, while KDE simultaneously reports a "fully certified" teacher workforce.[18] This formulation of the problem, of course, begs the question of whether middle or high school teachers need at least a minor in the subject they teach or if the certification system as practiced in Kentucky is adequate to ensure content preparation. The assertion by NCTAF about necessary preparation levels, though, does seem reasonable, but this is certainly a subject upon which there might usefully be some debate within the state.

Middle School Math Transcript Study of Teacher Preparation Levels

To shed more light on the out-of-field teaching issue in Kentucky and to learn more about the coursework preparation of Kentucky teachers, the Kentucky Long-Term Policy Research Center and KDE jointly conducted a research project in the spring and summer of 1998 to study the transcripts of a select group of teachers in the state.[19] The initial inquiry examined teachers of middle school math in Kentucky. This seemed to be a useful focus of attention, for several reasons. First, sound math instruction during the middle grades is critical for higher math attainment in high school and college. Second, the SASS out-of-field teaching results showed potential preparation problems in math at grades 7-12, yet KDE officials have claimed, as noted, that this problem is due to the middle school teacher certification situation. Third, the oft-cited Third International Math and Science Study (TIMSS) provides persuasive empirical evidence that, at the national level, teacher math preparation levels, curriculum incoherencies, lack of content-oriented professional development, tracking practices, and mile-wide-but-inch-deep math textbooks contribute to poor middle school math performance.[20] It is likely that such factors affect middle school math results in Kentucky as well. Hence, middle school math became the subject of our analysis.

Method

A representative, stratified sample of middle school math teachers was selected for the analysis. To generate the sample, the research team had KDE's Division of Integration Services search the Department's 1997-98 Professional Staff Data (PSD) set to identify all teachers teaching math at a middle school in the Commonwealth. "Math" included any one of the following three courses: Middle School Mathematics, Pre-Algebra, or Algebra I—Eighth Grade. These courses are the primary middle school math curriculum components, and the query identified 1,650 teachers across the state.

These teachers were separated according to the course(s) they taught, and the three pools of teachers then systematically sampled. The initial sample showed that some KDE service center regions were underrepresented; hence, additional teachers were sampled from the groups to guarantee that all geographic areas of the state were fairly represented. The final sample of middle school mathematics teachers with usable data totaled 270.

The next step was to search the files of the teachers in the sample—files which have been compiled in various formats—and create readable paper files for each teacher. After this was done, relevant data for each teacher were entered into a database. To keep teacher preparation data confidential, no names were entered into the database, and no paper copies of the files were removed from the OTEC offices. Graduate students hired for the project then entered data on a range of variables.[21]

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[18] As of late 1998, KDE reported that only about 135 teachers statewide were inappropriately certified.

[19] The middle school math teacher transcript study was conducted by the author, along with William E. White, Office of the Commissioner, KDE, and Pat Hartanowicz, Education Professional Standards Board, KDE. Peter Schirmer, Kentucky Long-Term Policy Research Center, analyzed the data.

[20] William Schmidt, et al., *Facing the Consequences* (Boston: Kluwer Academic Publishers, 1998).

[21] The variables include: number of undergraduate colleges attended; names/codes of colleges attended; degree-granting college; year of graduation from undergraduate college; undergraduate grade point average; undergraduate major; graduate school(s) attended; graduate school major; level of certification (elementary, middle, high/secondary); total course units transferred into undergraduate degree-granting institution; number of math courses repeated; number of remedial math courses

Findings in Summary

Perhaps the most important findings have to do with majors of middle school math teachers, their certification levels, and teacher qualification/preparation levels among those at low- and high-poverty schools. Table 5 shows the distribution of majors among these teachers, which generally bears out the claim that only modest percentages of middle school math teachers have studied math extensively at the undergraduate level. About 24 percent of those in the sample actually majored in math or math education in college. Another 34 percent majored in elementary or pre-elementary education, and some 31 percent majored in other education areas (including special education, middle school education, and secondary education [nonmathematics]).

The study also determined, although it is not included in the table below, that another 15 percent of the teachers in the sample had *minored* in mathematics. That is, 15 percent of the sample was comprised of individuals who had completed at least 12 hours of math courses at the 300 level or above. The study did not determine other minors possessed by those in the sample.

TABLE 5
Distribution of Majors for the Middle School Math Teachers Used for the Transcript Study

Major	Statewide Percentage	Avg. Hours Math Credit
Elementary/Pre-Elementary Education	34%	15.4
Other Education Majors (Special Education, Middle School Education, Secondary Education [nonmath])	31%	22.8
Math	21%	40.6
Business/Accounting	3%	27.7
Humanities	3%	20.1
Math Education	3%	37.6
Social Sciences	3%	19.4
Other/Unknown	2%	29.2
Sciences	1%	28.1

A major finding of this study is as follows: *If teaching "in field" is defined—following NCTAF—as having a math or math education major or minor, then only 39 percent of middle school math teachers received ample college coursework in math, and the remaining 61 percent are teaching out of field.*

This finding accords very roughly, it should be added, with differently calculated NAEP data from 1996 on the majors of Kentucky Grade 8 math teachers. According to a 1996 NAEP Kentucky state math report, 43 percent of students taking the math assessment in Kentucky were reported as studying under a teacher who had majored in mathematics.[22] Note that this calculation is linked to percentage of students, not overall percentage of teachers. Nevertheless the NAEP data also suggest that well over half of the middle school math teachers in the state have not had extensive mathematics backgrounds at the undergraduate level.

The discrepancy in training between math majors and minors, on the one hand, and those with neither a major nor minor in math, on the other, is substantial, as might be expected. Math majors in the sample had taken an average of 40 hours of math courses, some 22 hours of which were at the 300 level or above. Math minors had taken an average of 31 hours of math courses, some 17 of which were at the 300 level or above. Those who majored and minored in other areas had only taken on average 17.5 hours of math courses, just under 5 of which were at the 300 level, and another 5 hours

completed; number of level 100, 200, or 300 math or math education courses completed; number of all math and math education courses completed; whether Calculus I, II, or III was ever completed; and the percentage of free and reduced lunch students at each teacher's school.

[22] The NAEP 1996 State Assessment in Mathematics: Kentucky Report, 207.

at the 200 level. These results are shown in Table 6. The study could not ascertain differences in course *content*, however, so it is not possible to make inferences about, for example, the 17.5 hours taken by nonmajors/nonminors.

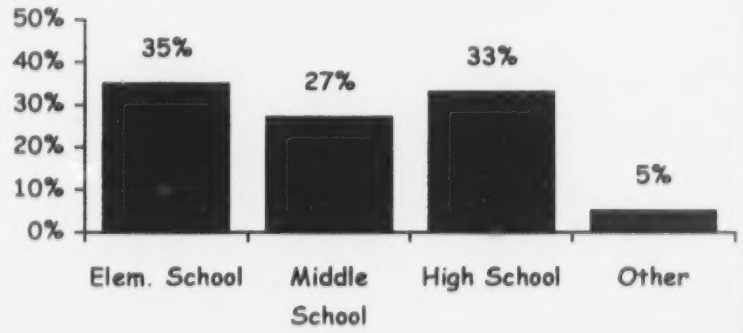
TABLE 6
Average Course Credit Hours of Middle School Math Teachers

	Math Majors	Math Minors	Non Math Majors/Minors
100 Level	9.4	7.1	7.5
200 Level	9.0	6.9	5.2
300 Level (& above)	22.2	17.3	4.8
Total	40.6	31.3	17.5

As noted earlier, Kentucky certification regulations permit individuals with varying levels of certification, such as elementary K-8 certification, to teach middle school math. Applying the state's own qualification criteria to middle school math teachers virtually eliminates the problem: for 1997-98, for example, only 10 teachers of mathematics were identified as teaching out of field under certification guidelines.

A glance at additional transcript study data illustrates the effects of this certification approach on math preparation levels. As shown in Figure 5, more than a third of middle school math teachers have elementary certification and about 27 percent have middle school certification. Only about one third of those who teach the middle school math courses carry a high school certification, which requires a mathematics concentration. Just over 5 percent of teachers have some other certification. Hence, by allowing elementary and middle school certified teachers to teach middle school math and by not requiring individuals with these certifications to have extensive math preparation at the 300 level or above, the certification system allows teachers without strong math backgrounds to teach middle school math classes.

FIGURE 5
Certifications Possessed by Middle School Math Teachers in the Sample



Given that these study results tend to support the argument that weak content preparation among middle school math teachers exists because of the certification regulations allowing those with elementary and middle school certifications to provide instruction, it is also likely that out-of-field teaching in math is *not* as common at the high school level as the SASS study results for grades 7-12 suggest. However, until high school math teacher transcript data comparable to this middle school teacher data are available, it will not be possible to determine if this is the case.

As noted earlier, the EPSB has been moving in the direction of beefing up middle school math teacher qualifications. Effective October 1, 1998, an EPSB directive requires those seeking middle school certification to take content specialty tests in two subject areas. This will necessitate prospective middle school math teachers to prepare at a higher level, or at least be able to demonstrate skill competency at a certain level on a nationally standardized examination. But this will only apply to new teachers and those seeking to add middle school certification, and will therefore not affect those already approved to teach middle school math.

Math Preparation Levels Among Wealthy and More Impoverished Districts

Interestingly, the transcript study results show some differences in math preparation levels among teachers in the wealthiest and poorest districts in Kentucky. But it appears that middle school math teachers in the poorest districts have slightly *better* preparation levels than their counterparts in wealthier districts. This finding seems to counter NCTAF-sponsored study results, which show teachers at high poverty schools in inner cities to be considerably less well prepared than those wealthier suburban districts.[23]

For the Kentucky study, two analyses were conducted that examined teachers based upon t percentage of free and reduced-price lunch students at their schools. Among middle school math teachers at schools with above 50 percent student eligibility for free and reduced-price lunch, some 38.5 percent were math or math education majors. In schools with below 50 percent of the students eligible for free and reduced lunch, 34.6 percent were math or math education majors.

Another analysis examined the lowest quarter of free and reduced-price lunch eligible schools as well as the highest quarter of such schools. Among teachers at the poorest schools, almost 30 percent had math or math education majors. Among teachers at the wealthiest schools, slightly less than 25 percent had math or math education majors. Among the schools in the middle two quartiles, only 20.3 percent of teachers were math or math education majors (note that these calculations focus only on majors and do *not* include minors). Therefore, schools in the middle of the distribution tend to have lower percentages of the math or math education majors than those at either end of the wealth spectrum. Taken together, this information suggests that in Kentucky teachers have similar preparation levels in both wealthy and poor districts, at least in terms of middle school math teacher training. What these results do not reveal, however, are differences among the wealth quartiles in terms of age, experience levels, and year preparation programs were completed for these teachers. Such differences, if they exist, might help account for student performance variations among districts in the quartiles.

Several additional findings have emerged from this study. For example, most teachers have attended at least two undergraduate institutions, which might raise problems with course credit transfers. Also, about a quarter of the sampled teachers had repeated at least one math course, although it is uncertain what this indicates about course-taking habits. Finally, only about 55 percent of teachers in the sample had taken a standard Calculus I course. It therefore appears that almost half of all middle school math teachers have received no training in this area of mathematics. This could signal a problem, inasmuch as middle school mathematics courses can be seen as laying the conceptual and skill groundwork for calculus and advanced math in late high school and college.

Limitations

Several limitations exist with regard to these research findings, and we mention them briefly. They do not, however, significantly alter the results of the analyses. First, we did not attempt to "equate" the math courses listed on the transcripts, such that we could compare a course listed as Math 158 at one institution with those listed as 102 or 175 at other institutions. Given the variations

[23] See, for example, Linda Darling-Hammond, "Unequal Opportunity: Race and Education," *The Brookings Review*, Spring 1998: 28-32. Darling-Hammond is Executive Director of NCTAF and has been the guiding force behind most NCTAF publications.

in course numbering sequences across institutions and time, not to mention variations in actual course content, this would have been impossible. Rather, we relied on a combination of course titles and "levels," e.g. 100, 200, 300, and so forth, for our study and analyses. This approach yielded the information we were seeking about preparation and certification levels, but does not allow us to compare, for example, the depth or quality of math training among teachers with similar course-taking backgrounds from different institutions.

Second, this study does not allow us to determine the distribution of middle school math teachers among schools around the state. Recent *Lexington Herald-Leader* stories, for example, have suggested that certain middle schools have chosen to hire as math teachers only those who majored in math at the undergraduate level. Inasmuch as this has happened at certain middle schools around the state, then the 39 percent of math majors or minors may be concentrated in a relatively small number of locations. But we cannot determine if this is the case based on the data compiled for this particular study.

Third, and perhaps most important, we do not have data that will allow us to link teacher math preparation levels with student achievement. As noted, we have followed NCTAF and others in designating academic disciplinary study at the minor level in undergraduate school as adequate for middle or high school math instruction. Determining if study at this level is the crucial factor in student math achievement scores at the middle school, however, is beyond the scope of this study or of the available data.

Conclusion

Based on the findings of this transcript study along with the SASS data cited earlier, it appears that significant amounts of out-of-field teaching exist in Kentucky, certainly in terms of mathematics at the middle-school level. As noted, this is not due to a failure of KDE's teacher certification system. Rather, a new set of expectations has evolved about how much course-taking teachers should engage in before entering the classroom. Kentucky is addressing these new expectations, but slowly. Moreover, how much out-of-field teaching is taking place in other subject areas and at other levels of schooling, particularly the secondary level, is unclear, and similar studies could be undertaken to find out. It is unlikely that this situation *only* exists with math and not other subjects and levels. One could infer from this information, therefore, that much work remains to be done in terms of determining the content preparation levels of Kentucky teachers and determining what action should be taken if weaknesses are identified.

Teacher Quality Indicators and the Kentucky Teacher Workforce

To summarize, based on the quality indicators identified for this study as well as the results of the middle school math transcript study, there appears to be both good news and less encouraging news about Kentucky teachers. Commonwealth teachers are about as experienced as their counterparts elsewhere and have achieved significantly greater amounts of graduate training than the typical teacher in the nation. The ACT scores and GPAs of those entering the teacher training system in recent years are above average. And Praxis new teacher results show trainees scoring close to national averages on some subject area tests.

On the other hand, out-of-field teaching seems to be a problem, although the extent of its occurrence can only be estimated. According to SASS studies, the problem seems to be most acute in math, English, history, and certain areas of science. The middle school math transcript study indicates out-of-field teaching seems clearly to be a problem at the middle school level in this subject, but might also be a problem in other subjects and at the high-school level. Moreover, KDE's data collection system cannot be used to assay out-of-field teaching levels, at least not as those are determined by relying on majors or minors. KDE relies instead on its certification system, which currently shows an almost fully certified teaching force in the state.

Conspicuously absent from the available data is information on actual teacher performance in the classroom or on relationships between student performance and teacher qualification levels. Simply

put, there is currently no way to link the skill and knowledge levels of teachers, either individually or collectively, with the performance of their students, which is the key outcome variable of the public schooling system. Granted, measuring teacher performance is notoriously difficult. Moreover, student achievement results from a given teacher's classroom would be extremely difficult to interpret, given variations in student abilities and efforts from class to class, student mobility, and given that teachers often switch grade and occasionally even subjects from year to year. Nevertheless, data that allow officials to make *some* judgments about teacher quality and student performance, perhaps based on scores from groups of teachers and their students, should arguably be part of an effective accountability system and could provide information useful to those who plan professional development and determine staffing for schools.

Photo by Rick McComb, Kentucky Department of Education

TEACHER QUALITY AND FUTURE ISSUES

Turning from direct data about teacher quality, we consider related policy issues and decisions that will likely affect the teacher workforce over the next several years. The data presented in the earlier sections of this report suggest several areas. This chapter begins with a discussion of the need for better ways to determine the strengths and weaknesses of the Commonwealth's teachers, a prerequisite to any meaningful reform. It next addresses key influences on the teacher population, turnover, and supply and demand. These issues are relatively straightforward compared with the complex issue of teacher salaries. Here, we sketch out some of the complexities and effects policymakers will have to take into account as they attempt to craft a pay plan that fosters quality teaching. Rewarding the incompetent and gifted equally is unlikely to yield the desired results. Finally, the chapter addresses two closely linked issues, performance-based education and the professional development of the state's teachers.

Better Indicators Regarding Teacher Strengths and Needs Are Required

During the process of identifying data indicating teacher quality and of undertaking the previously discussed transcript study, it became clear that far too little reliable empirical data exist about Kentucky's teachers. Information about aggregate experience and graduate attainment levels, ACT and Praxis scores of recent teacher education students, and the various out-of-field teaching data cited provide a window into the teacher workforce. But that window needs to be enlarged considerably if we are to learn as much as we need to know about the knowledge and skill levels of the state's teachers, and how these affect student achievement.

Creation of a comprehensive data system to learn more about the knowledge and skill levels of Kentucky teachers could be the next logical step to take in statewide school reform.

That the average teacher in the state has 15 years experience, a master's degree in education, and adequate certification, for example, tells us that Kentucky's preparation and certification system has created a cadre of competent individuals reasonably well schooled in pedagogy and the dynamics of the school environment. But these data tell us little about how individual teachers fare in classrooms full of students, or about the performance of those at different ends of the experience and graduate schooling spectrum, or about those in different academic disciplines.

Test score data on graduates of teacher training programs, alternatively, are only available for those who have recently entered the workforce. We do not know how 20-year veterans compare in terms of knowledge and skills with those currently entering the teaching force. Nor do we have enough data to determine if the test scores available for new teachers correlate with strong teaching capabilities. Indeed, the data system currently treats the young and the old, the enthusiastic and the burned out, the conscientious and the irresponsible, the ever-improving and the never-improving the same, as long as certification and paperwork requirements have been met.

As the out-of-field studies illustrate, much more could be learned about the preparation levels of Kentucky teachers if the Department of Education or an entity allied with it were encouraged and funded to create a more comprehensive data system on teachers and teaching. If course information

for each teacher were entered into a database, along with other relevant achievement and quality information, and these data were in turn linked to the extant teacher tracking systems at KDE, researchers or department officials could provide the information necessary to make intelligent choices about resource allocation and policies. They could determine, for example, if teacher preparation levels were adequate for the courses that were being taught. They could explore the linkages between preparation and certification levels and student achievement. And it would also be possible to identify potential problems in the certification system. In addition, this system could greatly aid the Department in its pursuit of a well-designed and functional teacher professional development system. Recent research on Kentucky professional development—discussed later in this section—has revealed that professional development in Kentucky has improved in the KERA implementation period. But further changes need to be made, according to the best available evidence, if teacher content knowledge is to be strengthened and if in-service training is to lead to long-term behavioral change among teachers. Furthermore, a better data system would also aid the Legislative Research Commission's public school watchdog agency, the Office of Education Accountability (OEA), in its efforts to track and report to the General Assembly on conditions in education.

Around a quarter of the teacher workforce is at or within three years of retirement eligibility.

In a sense, creation of a comprehensive data system to learn more about the knowledge and skill levels of Kentucky teachers could be the next logical step to take in statewide school reform. Systemic reform—the approach embraced by the General Assembly with KERA in 1990—is about building accountability and measuring outcomes, and then allowing educators and parents at individual schools to make the adjustments necessary to meet expectations. The Commonwealth has made a difficult but substantive start down this road with its student assessment system, the core curriculum, school accountability efforts, school councils, and performance standards for new teachers. KERA has to this point brought a measure of accountability to schools. But extending it to individual students and teachers, and even parents and communities, may need to be the focus of reform's second decade.

Turnover in the Teacher Workforce

The next few years provide an opportune moment to make further changes aimed at improving the teacher workforce, in part because a considerable portion of Kentucky's teachers are nearing retirement age and may be leaving classrooms over the next few years. According to data generated in 1997 by the Kentucky Teachers Retirement System (KTRS), shown in Table 7, it appears that around a quarter of the teacher workforce in the state is at or within about three years of retirement eligibility, currently 27 years of experience. And as Table 8 illustrates, the average teacher does retire with about 27 years of service.

TABLE 7
Number of Kentucky Teachers At or Near Retirement Eligibility

Category	Number	Cumulative Number
Currently Eligible for Retirement	5,153	5,153
Within 1 Year of Eligibility	1,893	7,046
Within 2 Years of Eligibility	1,955	9,001
Within 3 Years of Eligibility	2,057	11,058

Source: Kentucky Teachers Retirement System, Summer 1997

It also appears that an increasing number of individuals who reach retirement eligibility are choosing to leave the classroom, based on data recently supplied by the KTRS to the Kentucky Long-Term Policy Research Center. As shown in Table 8, retirements have moved from closer to 1,000 per year in the early 1990s to within sight of 2,000 by the end of 1997-98. Note, too, that the average age

of teacher retirement has been dropping from 60 to the mid 50s. Both of these facts might be attributable to the reduction over the years of the retirement eligibility age, to the increasing demands being made of teachers under reform, or to early retirement incentives offered by certain districts over the past few years. This rate of departures might also be viewed with some alarm, inasmuch as individuals in their 50s are in most professions deemed to be at the height of their skills.

TABLE 8
Kentucky Local District Retirements

Fiscal Year	Count	Average Age	Average Years of Service
1985-86	801	60	28.7
1986-87	655	59	27.3
1987-88	544	59	27.3
1988-89	1,060	57	27.6
1989-90	914	57	27.9
1990-91	897	58	26.7
1991-92	929	57	27.4
1992-93	1,099	57	27.9
1993-94	1,206	56	27
1994-95	1,371	56	28
1995-96	1,285	56	28
1996-97	1,765	55	27.6
1997-98	1,850	54	26.9

Source: Kentucky Teacher Retirement System, Fall 1998

Presuming that many teachers who reach eligibility in the next few years continue this trend and opt to retire, Kentucky's 176 school districts will have to engage in a flurry of hiring activities to find replacements. If a more comprehensive data system were created over the next year or two, while much of this hiring is taking place, then Kentucky will be in a much better position to assess the efficacy of its recruitment and certification policies in five or ten years than it now is.

It is noteworthy that at least one source external to the state education bureaucracy has affirmed that a host of teachers will need to be hired in Kentucky over the next few years. Kentucky's Workforce Development Cabinet in 1997 published its projections of occupational hiring likely to take place through 2005. According to that document, over the next seven years three of the five top job growth categories for occupations requiring at least a bachelor's degree involve public school teaching jobs. Based on these projections, Kentucky's companies will annually hire around 1,600 managers and executives, and medical offices will hire about 1,100 registered nurses. But the state's schools will hire around 900 elementary teachers per year, another 600 or so secondary teachers, and just shy of 400 special education teachers.[24] Hiring around 2,000 teachers per year would seem to provide grounds for learning more about the effects of this hiring on the overall teacher workforce.

Teacher Supply and Demand

Given that thousands of teachers will likely have to be hired by Kentucky school districts over the next few years, it is prudent to ask what factors will most affect the recruitment and retention of high-quality teachers. Teacher hiring needs will vary considerably from place to place, and it does not appear that the data currently available are sufficient to shed light on this variation and potential future needs.

At the aggregate level, Kentucky does not appear likely to face significant shortages of certified teachers, although there may be problems in certain parts of the state and certain disciplines. In 1996,

[24] Kentucky Workforce Development Cabinet, Research and Statistics Branch, *Kentucky Occupational Outlook to 2005* (Frankfort, KY: Author, 1997) 8.

Data and Decision Analysis, Inc. (DDA) analyzed Kentucky teacher employment patterns from 1989 to 1995 and concluded that the Commonwealth would actually have slight surpluses in most subject areas. According to the DDA report, produced in conjunction with the SREB, Kentucky should expect a 1 percent to 4 percent surplus of teachers in elementary schooling, social studies, language arts, math, biology, and art. Slight shortages will likely exist in the subject areas of chemistry and physics, with greater shortages—6 percent to 8 percent—in teachers certified to deal with learning disabilities, speech disorders, and those with multiple handicaps.[25]

KDE officials report that they frequently receive calls from superintendents who cannot fill slots with qualified individuals, especially in high schools and subject areas such as science and math.

KDE officials, however, have hesitated to rely upon these findings, which are based on teacher turnover, training, and student enrollment assumptions that may be problematic. Indeed, other data suggest there might be greater shortages than the DDA study indicated. Again relying upon analyses of the 1993-94 SASS data generated by the National Center for Education Statistics in Washington, D.C., it appears that between 11 percent and 17 percent of Kentucky high schools have had difficulty finding math, physical science, biology, and English teaching positions (see Table 9). One in five elementary and secondary schools reported problems finding special education teachers. But Kentucky will not apparently have shortage problems in other areas. Table 9 also shows the extent to which Kentucky's shortage problems reflect similar problems elsewhere.

TABLE 9
Percentage of Schools Reporting Difficulty Filling Vacancies in Selected Teaching Fields

		Secondary Schools					
	Elementary	Math	Physical Science	Biology	English	Special Education	English as a 2nd Language
Kentucky	0.5	16.8	13.2	11.9	11.5	20.7	0.3
U.S.	3.0	16.9	16.1	12.4	9.8	18.3	5.8
Contiguous States*	5.1	12.2	10.9	10.7	8.3	15.2	3.1

* NOTE: These numbers represent a simple average rather than a weighted average.
Source: Analysis of 1993-94 SASS Data, Doing What Matters Most: Investing in Quality Teaching, NCTAF, November 1997

The issue in Kentucky will more likely be one of distribution of appropriately trained individuals within the state rather than shortages in numbers of available teachers statewide. Indeed, reports from local districts suggest that recruitment problems in some places may be acute. KDE officials report that they frequently receive calls from superintendents who cannot fill slots with qualified individuals, especially in high schools and subject areas such as science and math.[26] Given the reluctance of school district officials to publicize these sorts of problems, it is possible that other districts may face similar difficulties.

Two important points should be made regarding supply and demand. First, it is likely that teacher shortages would be much *worse* in many parts of Kentucky if the certification system did not mask the unevenness in teacher preparation levels revealed by the out-of-field teaching data. As shown by the previously cited studies, for example, significant percentages of math and science teachers at the middle school level—and *some* percentage of high school teachers in an array of subjects—have not studied the academic discipline they are teaching enough to possess an undergraduate minor. If the

[25] Southern Regional Education Board Data and Decision Analysis, *Educator Supply and Demand in Kentucky: Report on Phase Two*, March 1996.
[26] Interview by author of officials of KDE's Office of Teacher Education and Certification. See also, for example, Linda B. Blackford, "Kentucky Running Low in Teacher Supply for Some Subjects," *Lexington Herald-Leader*, 12 Aug. 1998.

certification system in Kentucky were changed immediately to at least a minor in the subject one teaches as the minimum qualification for teaching, then it is likely that teacher shortages would be a more serious problem that communities statewide would have to confront. It is unclear how local and district officials would respond.

Second, potential teacher shortages could conceivably be addressed by attracting into the classroom qualified individuals who live in Kentucky and possess valid or expired certifications, but are not currently teaching. According to KDE, around 104,000 individuals currently hold valid teacher certifications, although only around 40,000 are classroom teachers and another 5,000 to 6,000 are administrators. This implies that over 50,000 people in the Commonwealth possess teacher certifications that have not yet expired but are not teaching. Many of these certificates are held by retired teachers or those who have relocated to another state—KDE has no easy way of determining what these individuals are doing, whether they would like to be teaching, or what it would take for them to enter or return to the classroom. It is possible, however, some portion of Kentucky's potential teacher shortage problems could be resolved by enticing certified individuals from this pool to claim difficult-to-fill teaching posts.

Another factor in teacher recruitment and retention, quite obviously, is teacher salary levels. How teachers are prepared for the classroom and certified will also play an important part in this picture, as will the ways Kentucky meets the training needs of teachers once they have accepted a teaching position.

Teacher Salaries

An oft-cited argument in Kentucky and elsewhere over the decades has been that teacher quality can be raised if teacher salaries are raised significantly. While policymakers have clearly believed in the importance of enhanced teacher salaries, there is significant disagreement about the extent to which salary raises might make a difference in teacher and student performance. Nor have empirical research findings answered these questions.

Should teacher salaries be increased in an attempt to elevate the overall quality of the teacher workforce?

The starting point for a discussion of teacher salaries must be to answer a simple question, namely, what *do* teachers in Kentucky currently earn? According to the latest available data, shown in Table 10, the average teacher salary in Kentucky during 1996-97 was just under $34,000 per year. This is about 88 percent of the national average teacher salary, which is roughly the level at which Kentucky teachers have been remunerated for several years. During the 1980s, it should be noted, that percentage drifted downward to around 84.

Several points about recent aggregate teacher salaries in Kentucky are in order. First, the Kentucky salary average is currently above the average of the states in the southeast region and is close to the average of the states bordering the Commonwealth. Indeed, according to a recent publication, Kentucky's teacher salary average ranks 28th among all 50 states, although the state ranks 42nd in terms of per capita income.[27]

[27] Kendra A. Hovey and Harold A. Hovey, *CQ's State Fact Finder: Rankings Across America, 1998* (Washington, DC: Congressional Quarterly, Inc., 1998).

TABLE 10
Average Teacher Salaries in Kentucky and U.S., Selected Years

Year	KY Average	US Average	KY as % of US
1980-81	$15,750	$17,590	89.5%
1982-83	18,385	20,725	88.7
1984-85	20,230	23,595	85.7
1986-87	22,476	26,556	84.6
1989-90	26,292	31,367	83.8
1990-91	29,115	33,114	88.0
1991-92	30,869	34,063	90.6
1992-93	31,115	35,029	88.8
1993-94	31,625	35,819	88.3
1994-95	32,434	36,933	87.8
1995-96	32,934	37,560*	87.7
1996-97	33,797	38,509*	87.8

Source: Kentucky Department of Education, Digest of Education Statistics, 1997 (Washington, DC: National Center for Education Statistics, 1998)
* Estimates

It is also worth noting that the *average* salary figures provided above do not indicate the salary *range* among teachers at different rank and experience levels. As do numerous other states, Kentucky utilizes a salary schedule system that sets remuneration levels based on years experience and rank, which have in turn been influenced by the amount of formal education a teacher receives.[28] Table 11 shows the distribution of salary averages at the different rank and experience levels. Table 12 shows the distribution of teachers within the state at the different rank and experience levels.

As these data show, the most experienced and highest ranking elementary and secondary teachers draw salaries in the $42,000 to $43,000 range, whereas early career teachers at lower rank and experience levels typically draw salaries ranging from $24,000 to $30,000. Interestingly, during 1996-97 over 6,500 teachers in Kentucky held Rank I status and had over 15 years of experience, while another 9,300 or so had Rank II status and comparable experience levels. At the other end of the spectrum, over 5,800 teachers were "beginners," and another 5,100 or so held Rank II status and had 4-9 years experience.

[28] A Rank III teacher is someone who has obtained a college degree or its equivalent from an approved four-year institution. A Rank II teacher has accumulated at least 30 hours of graduate work, which may include a master's degree, or the equivalent continuing education. A Rank I teacher has earned at least 30 hours of graduate work or the equivalent continuing education beyond Rank II and in a subject field approved by the EPSB, or has met requirements for Rank II and also holds current certification of the National Board for Professional Teaching Standards. Technically, Ranks IV and V exist for those who have not obtained a bachelor's degree, but only a handful of teachers fall into this category.

TABLE 11
Kentucky Teacher Salary Averages, by Rank and Experience, 1997-98

Elementary Teachers					
	Experience Groups: By Years				
Level/Rank	0-3	4-9	10-14	15-19	20+
Rank I	$30,602	$33,840	$38,052	$40,415	$42,204
Rank II	27,243	30,559	34,847	37,509	39,198
Rank III	24,292	27,454	32,165	34,329	36,153
Secondary Teachers					
	Experience Groups: By Years				
Level/Rank	0-3	4-9	10-14	15-19	20+
Rank I	$32,943	$35,287	$38,739	$41,935	$43,817
Rank II	28,068	31,582	35,993	38,455	40,674
Rank III	25,249	28,675	33,589	37,448	37,216
Special Education Teachers					
	Experience Groups: By Years				
Level/Rank	0-3	4-9	10-14	15-19	20+
Rank I	$30,380	$33,590	$38,082	$40,631	$42,616
Rank II	27,363	30,564	34,710	37,787	39,336
Rank III	24,128	27,365	30,977	34,279	34,817

Source: KDE, Division of Management Assistance Services, beginning of 1997-98 year data

TABLE 12
Distribution of Kentucky Teachers, by Rank and Experience, 1997-98

Level/Rank	Experience Groups: By Years				
	0-3	4-9	10-14	15-19	20+
Rank I	127	1,067	1,542	1,746	4,817
Rank II	1,206	5,138	4,271	3,277	6,046
Rank III	5,858	2,252	217	108	381

Source: KDE, Division of Management Assistance Services, beginning of 1997-98 year data

While these numbers show the aggregate variation among teachers at different rank and experience levels, they do not reveal the variation from district to district. School districts have traditionally begun with the minimum salary schedule and added supplements to bring salaries up to acceptable levels. This practice has led district salaries to vary considerably, depending upon available resources, other plans and needs, the age and rank distribution of teachers within the district, local cost of living concerns, "market" conditions, and the like. Hence, below the state-level salary, comparisons of teacher salaries get very complex. The variations have persisted even though the minimum salary schedule has not been used by many districts in recent years.

What does this information on average teacher salaries and the range of salaries tell us that is useful for policymaking? Not nearly enough. Viewed from the perspective of a relatively poor, mostly rural southeastern state, the teacher salary picture in Kentucky looks fairly optimistic. As noted, Kentucky teacher salaries are roughly in line with those of other states and ahead of those elsewhere in the region. Beginning salaries are very modest, but so are those of other civil service jobs in the Commonwealth. Moreover, salaries for the most experienced teachers are considerably better than for many other workers in Kentucky. Teachers also receive a very respectable benefits package, which is not reflected in the salary figures cited above. Given that teachers already have a rank- and experience-based career path, and given the attractiveness of teacher salaries in economi-

cally underdeveloped parts of the state, an advocate of this perspective might argue that teaching in Kentucky is an attractive career option.

Comparing teacher salaries with those in other Commonwealth occupations can reinforce this argument. Such comparisons are difficult. Different jobs require very different types of training and work experiences. Salary conditions shift from industry to industry, from private sector to public sector, from region to region, and also reflect the vagaries of the marketplace. Moreover, data on other jobs and professions is usually not kept in such a manner as to make for easy comparison with teacher salaries. Nevertheless, it is hard to address the adequacy of teacher salaries without some idea of salaries in other fields.

As shown in Table 13, it is possible to make a very crude comparison of salaries among occupations that require at least a bachelor's degree. Kentucky's Workforce Development Cabinet keeps salary and wage data on several hundred different job categories. Using data from the Workforce Development Cabinet, the Center compiled a list of 80 occupations for which at least a bachelor's degree is required. We ranked these occupations from 1st to 80th based upon mean or average hourly wage and then looked at salary levels at roughly every tenth percentile point along this spectrum. As Table 13 illustrates, aggregate teacher salaries cluster slightly above the middle of the range, ahead of roughly 50 percent to 60 percent of the other jobs on this list. However, teacher salaries are considerably below those of the best paying jobs.

TABLE 13

Comparison of Teacher Salaries with Those of Occupations Requiring Similar Educational Preparation Levels**

Occupation Title	Mean Hourly Wage, 1996
Law Clerks	$8.79
Clergy	$14.13
Reporters and Correspondents	$15.24
Teachers and Instructors, Vocational Education and Training	$15.87
Instructional Coordinators	$16.58
Administrative Services Managers	$17.79
Teachers, Special Education*	***$18.09***
Teachers, Elementary School*	***$18.69***
Teachers, Secondary School*	***$19.07***
Criminal Investigators, Public Service	$19.09
Mining Engineers, Including Mine Safety	$22.06
Occupational Therapists	$23.17
Marketing, Advertising, and Public Relations Managers	$24.35
Sales Agents, Securities, Commodities, and Financial Services	$32.84

*The hourly wages for this teaching occupation were adjusted to reflect a 9 1/2-month work year.
**This analysis is based on a sample of 80 occupations that require at least a bachelor's degree. The data were obtained from the Workforce Development Cabinet.

Based on these data, it does not appear that Kentucky teacher salaries are grossly out of line with those of other jobs available within the state that require a similar level of educational attainment. This is *not* to suggest that Kentucky policymakers should not strive to improve teacher salaries. Rather, it is to say that Kentucky teacher salaries seem to fare relatively well given the overall labor market within the state.

Here a key problem with these data and this perspective surfaces. Namely, we simply do not know how the teacher salary structure affects the quality of those attracted into teaching. As Table 13 shows, individuals in some white-collar professions earn considerably more than teachers. In addition, numerous professions, such as law, medicine, and civil engineering, are not represented on this salary comparison chart. If policymakers hope to attract into and retain in teaching the best and brightest, one might argue, then salaries and career options might more appropriately reflect those available in these more prestigious, more highly remunerated careers. It is certainly true that lawyers,

doctors, and engineers might begin careers at modest salary levels, but those who excel have much greater financial opportunities than do classroom teachers.

The Uncertain Impact of Teacher Salary Increases

Indeed, many consider it axiomatic that professions with substantial salary levels attract more talented individuals than do those with only modest or substandard salary levels. The theory here is rather straightforward. Higher wages should induce some people who otherwise would seek employment in other professions to pursue careers as teachers. Better teacher pay might also keep in the classroom individuals who currently enter school administration jobs, which offer higher pay levels. With a larger and more talented pool of teachers from which to draw, goes this logic, schools should end up hiring better teachers.

It is worth adding, however, that some researchers challenge the key assumption behind these projections—that teacher quality will improve if teacher salaries rise. In a recent study sponsored by the W.E. Upjohn Institute for Employment Research, the authors concluded, "There is little evidence that higher salaries have raised the quality of newly hired teachers, at least by the indicators of teacher quality [that were] examined."[29] Among the reasons cited by the study's authors for the apparent ineffectiveness of raises are "the institution of tenure and other forms of job security, the absence of merit pay or other systems for discriminating among teachers when awarding pay raises, costly barriers to entering the profession . . . and procedures for screening and hiring job applicants that overlook valuable signals of teaching effectiveness."[30]

In other words, merely raising salaries across the board may have unintended consequences that counteract the incentive effect of salary increases. For example, raising salaries tends to encourage teachers to remain in the classroom for additional years past retirement age. This phenomenon may be a salutary effect of the raises, but it would also likely diminish the number of openings for new teachers. Limiting the demand for new teachers might in turn discourage talented individuals from entering the profession, in spite of higher salaries. Of course, in theory, reducing the number of available teacher slots should also increase the pool of certified individuals from which schools can choose, which should mean that the more capable people are hired and overall teacher quality increased. Here again, however, it is unclear that school personnel will necessarily respond in this manner. Nor is it clear how much salaries would have to be raised to attract people into the profession who are currently being drawn to law, medicine, engineering, business, nursing, or any of a variety of better paying careers.

Moreover, inasmuch as some of the teacher quality data cited in the last chapter can be considered good news, a skeptic might argue that students of reasonable academic quality are already being attracted into the teaching profession with extant salary levels. As noted, teacher education students in recent years have above average ACT scores and grade point averages. And teacher education students in some institutions in the state have scores considerably above the average for all teacher education students.

It is certainly possible, however, that salary increases, if combined with an array of other incentives and policy changes, might indeed lead to a better teacher workforce. If policymakers in Kentucky move in this direction, then it would be worthwhile simply to know the complicated nature of the policy task that lies ahead of them.

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[29] Dale Ballou and Michael Podgursky, *Teacher Pay and Teacher Quality* (Kalamazoo, Michigan: W.E. Upjohn Institute for Employment Research, 1997) 53.
[30] *Teacher Pay and Teacher Quality*.

Projecting the Fiscal Impact of Teacher Salary Increases

Actual teacher salaries in Kentucky, at least as of the 1997-98 school year, were featured in Table 11. We noted there that in the aggregate Kentucky teachers have in recent years made on average around 87 percent to 88 percent of the national average teacher salary. We have therefore decided to investigate the fiscal impact teacher salary increases would have on the state budget, were Kentucky policymakers to pursue this route as a means of improving the teacher workforce.

For the purposes of this exercise, we use an array of data supplied by the Kentucky Department of Education. Based on one compilation of KDE teacher data, the Commonwealth in 1997-98 had a total of 38,152 classroom teachers, who were paid an average of $34,453.[31] Teacher salary costs are covered by a combination of state, local, and federal funds. Inasmuch as school districts are given some discretion in setting salary levels and allocating resources, and as KDE budget analyses are limited, we do not know the exact percentage of teacher salaries paid by the state. We do know, however, that the state pays close to 60 percent of teacher salaries. About another 10 percent of teacher salaries in Kentucky come from federal payments to the state. The remaining approximately 30 percent comes from local district revenues. In addition, the state annually contributes 13 percent of total teacher salaries to the teacher retirement system, and pays over $2,300 per teacher for health and life insurance. In the 1997-98 fiscal year, total state spending for classroom teacher salaries and benefits was about $1.1 billion.

Total state spending for the salaries and benefits of all certified personnel, including teachers, was $1.3 billion in the 1997-98 fiscal year, or more than one fifth of the entire state general fund.

Classroom teachers, however, are just one of several groups of school employees who are certified personnel. Other certified personnel include school principals, guidance counselors, librarians, and other administrative staff, whose salaries and benefits are linked by law. All certified personnel enjoy the same retirement and insurance benefits, and in practice if one group of certified personnel receives a raise, then the same raise goes to the others as well. Kentucky's other certified personnel numbered 7,215 in 1997-98, and they earned an average of $47,918. Assuming the state also pays 60 percent of their salaries, total state spending for the salaries and benefits of all certified personnel, including teachers, was $1.3 billion in the 1997-98 fiscal year, or more than one fifth of the entire state general fund.

If current trends continue in terms of salary increases, in 10 years—the 2008-09 fiscal year—we project that certified personnel salaries and benefits will cost a total of $2.65 billion, two thirds of which will be paid by the state (see Figures 6 and 7). This forecast assumes costs continue to rise at their recent historical rates. Salaries rose at an average annual rate of 2.5 percent between the 1991-92 and 1996-97 school years, and the state contribution for insurance is expected to grow about 5 percent per year.

[31] These numbers vary slightly from those presented earlier in this report, primarily because KDE counts teachers in different ways at different points during the year.

FIGURE 6

Projected Spending in 2008-09 for Certified Personnel

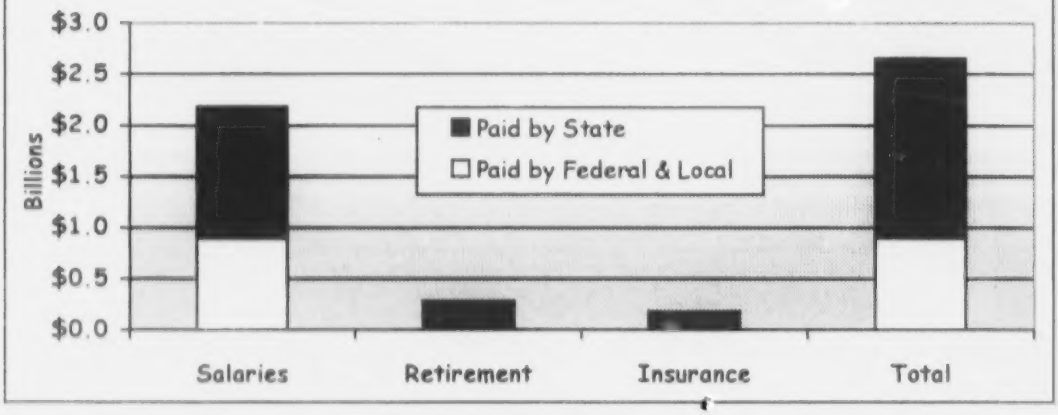
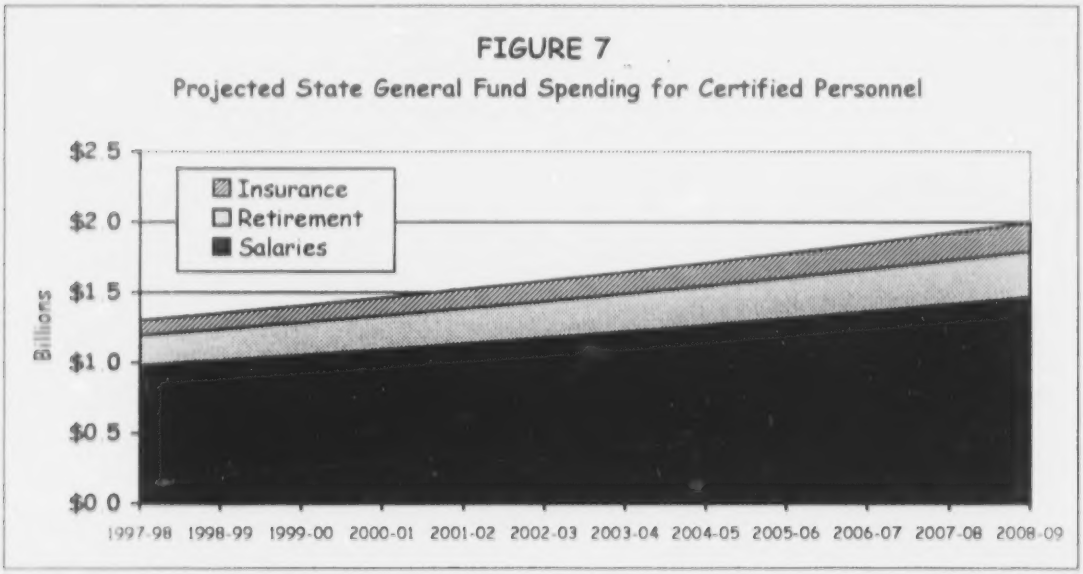


FIGURE 7

Projected State General Fund Spending for Certified Personnel



This projection also assumes the actual number of certified personnel remains the same over the next 10 years. It is difficult to estimate whether the certified workforce will indeed grow in coming years. The Kentucky Workforce Development Cabinet, for example, projects the number of classroom teachers in Kentucky to grow slightly more than 1 percent per year over the coming decade.[32] However, the U.S. Department of Education projects student enrollments in Kentucky will decline by about 3 percent over the same period. If student enrollment in Kentucky does indeed shrink over the next decade, then state per-pupil funding to declining districts might actually decrease and the number of teachers might drop. Given these alternative scenarios, we decided to split the difference between the forecasts and assume no change in the number of certified personnel. Note, too, that this projection does not take into consideration movement toward smaller class sizes, a much discussed

[32] Kentucky Workforce Development Cabinet, *Kentucky Occupational Employment Outlook and Job Openings, 1994 to 2005, 1994*: author.

political campaign issue that would certainly increase the number of teachers in the state's workforce and therefore increase the cost of our projections.

The Costs of Teacher Salary Raises

If state policymakers decided that raising teacher salaries between 5 percent and 15 percent would increase teacher quality in Kentucky, how much would it cost to implement such a decision? We have a rationale for choosing these boundaries for our projections: namely, average teacher salaries in Kentucky are roughly 15 percent below the national average teacher salary and are about 5 percent below the national average adjusted for the relative cost of living in Kentucky. We therefore looked at the budgetary impact of gradually reaching these salary targets over 10 years.

Kentucky's teacher salaries are currently about 87 percent of the national average. Both Kentucky's teacher salary average and the national teacher salary average are rising about 2.5 percent per year. If Kentucky policymakers decided to raise teacher salaries incrementally over 10 years to reach the national average, and if national teacher salaries continued to increase over this period at 2.5 percent per year, then Kentucky teachers would need to receive a 4 percent raise each year of the coming decade. At that rate of increase, certified personnel salaries and benefits would cost about $3 billion in 2008-09, or about $350 million more than the baseline projection. In other words, in 10 years total spending for all certified staff in Kentucky schools would be about 12 percent higher than it would be otherwise. Moreover, the cumulative *additional* spending on certified staff salaries over this period would surpass $1.75 billion (see Figure 8).

An alternative, and less expensive, scenario would be as follows. As noted, Kentucky teachers are paid about 87 percent of the national average teacher salary. Estimates typically place Kentucky's cost of living at slightly above 90 percent of the national average cost of living. If policymakers decided to boost Kentucky teacher salaries from 87 percent of the national average to 91 percent of the national average, how much would this cost? Again assuming a 2.5 percent national teacher salary growth rate, Kentucky teacher salaries would reach this 91 percent level after ten years by growing 3 percent per year rather than 4 percent. At that rate of increase, certified personnel salaries and benefits would cost a total of $2.75 billion by the 2008-09 school year, $100 million above the baseline projection. The cumulative additional spending over 10 years for this approach would be somewhat more than $500 million (refer to Figure 8).

In both scenarios, all certified personnel—not just classroom teachers—receive raises. The state contribution to the teacher retirement system for all certified personnel also increases because it uses a formula based on salaries. Estimated health and life insurance costs are assumed to stay at their baseline levels. Salaries account for 88 percent of the cumulative additional cost, and retirement contributions account for the remaining 12 percent.

FIGURE 8

Cumulative Additional 10-year Costs of Raises for Certified Personnel

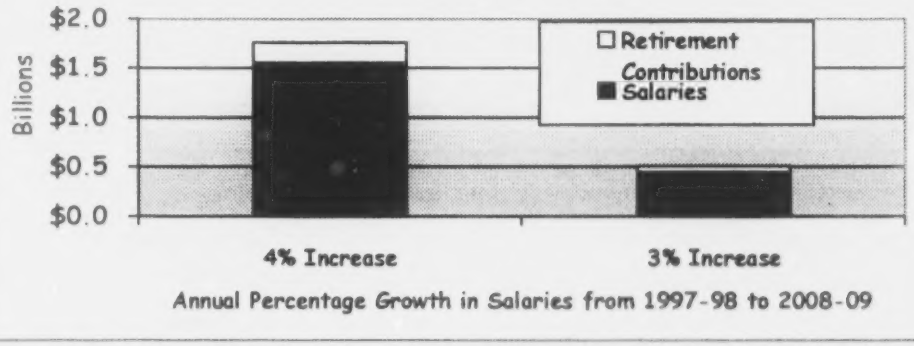


TABLE 14
Summary of Three Projections on Future Salaries of Certified Personnel

	Baseline	Scenario 1	Scenario 2
KY avg. as a percent of national avg.	87	100	91
Annual percentage growth in KY avg.	2.5	4	3
Total spending for salaries over 10 years	$19,580 million	$21,135 million	$20,027 million
Total spending for benefits over 10 years	$2,566 million	$2,770 million	$2,625 million
Total spending for insurance over 10 years	$1,474 million	$1,474 million	$1,474 million
Total spending over 10 years	$23,620 million	$25,379 million	$24,126 million

Who Pays for the Increased Salaries?

As noted above, the state pays the largest portion of teacher salaries and local school districts add to the state contributions. Federal dollars also help underwrite teacher salaries, but in some cases federal funds only pay for special kinds of classroom teachers. Given insufficient data on how these sources of revenue are distributed among Kentucky's 176 school districts, we do not know precisely how the cost of teachers' salaries divides among federal, state, and local revenues.

If Kentucky lawmakers decided to give teachers raises, state government would not necessarily have to pay the entire cost. It pays for all retirement contributions, but the additional salary expenditures could be divided between state and local governments, if not the federal government. If local school districts were to pay 34 percent of the salary increases, then the cumulative costs to the state in the two alternative scenarios would be $1.2 billion and $352 million, respectively. The cumulative costs to local school districts would be $540 million and $155 million.

Hence, this brief analysis suggests that raising teacher salaries so that they gradually increase to the national average, or even 91 percent of the national average, over 10 years would cost hundreds of millions of dollars. This is due in no small part to the fact that the salaries of all 45,000 certified personnel move as one; specific groups cannot receive changes in salary or benefits that the others do not.

To reiterate, we are not arguing for or against raising teacher salaries. We do think it is useful, however, to be able to gauge the potential budget impact of salary increases if state leaders expect to carry on a meaningful and coherent public debate about teacher pay levels. We are also pointing out the difficulties inherent in this policy option, both in terms of potential costs and in terms of our inability to predict the effect of salary increases.

Performance-Based Teacher Education

Another policy affecting the future of teaching in Kentucky involves certification rules and practices. Since KERA's passage, the EPSB has redesigned the certification system.[33] It has also authorized numerous related changes in the teacher preparation system. For many years, Kentucky teacher training institutions followed a fairly conventional model in preparing teachers. Students admitted to such programs had to take a minimum number of credit hours in courses, depending on their majors. For example, to receive elementary certification, a student had to take general education requirements, 18 semester hours of courses in elementary math, art and music, health and nutrition and physical education, 21 semester hours in an academic emphasis area (e.g., fine arts/humanities, social and behavioral studies, English communications, etc.), and 39 semester hours in pedagogy and methods courses (e.g., classroom management, human growth, development and learning, student teaching, etc.).

Kentuckians in school communities and colleges of education should be prepared for potential difficulties with the performance-based training system.

As of 1998, however, these requirements no longer applied. Instead, the 26 teacher training institutions are supposed to be preparing students to meet performance standards approved by the EPSB in recent years. These standards are shown in Figure 9, and the EPSB has also developed specific performance criteria to match each of these standards.

The idea behind the move to this system is rather straightforward and accords with KERA's embrace of an education system that focuses on outputs rather than inputs. Rather than dictate to teachers colleges what their students must study, the EPSB has identified what new teachers should know and be able to do—much in the same way that the Council on School Performance Standards in the early 1990s stipulated the learner goals and academic expectations for Kentucky students. Education colleges and departments then determine how to teach students to meet the standards and how to measure empirically student progress toward them. A student may graduate only after demonstrating that he or she has met the standards and is competent in all the skills associated with being an effective teacher.

[33] In terms of certification rules, the state's Education Professional Standards Board (EPSB)—the governance body for teacher certification and training issues—has recently streamlined the number of teacher certification categories from well over 100 into eight basic categories, with various subject area specializations. The advantage to this new system is that, at least in theory, school and district officials will have a much easier job of placing newly certified teachers in posts for which they have adequate training. Under the previous system, certificates and "endorsements" had proliferated such that even KDE officials had lost track of their numbers and types. Simply put, that system made it extremely difficult for officials to determine if certificated individuals indeed possessed the knowledge and skill levels desirable for a given teaching job. Under the new guidelines, teachers should be prepared more deeply in subject areas, while also being given latitude to teach in various grades. Given the current data system, however, the only indicator that will shed light on subject area preparation among students trained under the new system will be Praxis exams.

FIGURE 9
New Teacher Standards for Preparation and Certification

New Teacher Standard I, Designs and Plans Instruction. The teacher designs and plans instruction and learning climates that develop student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.

New Teacher Standard II, Creates and Maintains Learning Climates. The teacher creates a learning climate that supports the development of student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.

New Teacher Standard III, Implements and Manages Instruction. The teacher introduces, implements, and manages instruction that develops student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.

New Teacher Standard IV, Assesses and Communicates Learning Results. The teacher assesses learning and communicates results to students and others with respect to student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.

New Teacher Standard V, Reflects and Evaluates Teaching and Learning. The teacher reflects on and evaluates specific teaching and learning situations and programs.

New Teacher Standard VI, Collaborates with Colleagues, Parents, and Others. The teacher collaborates with colleagues, parents, and other community agencies to design, implement, and support learning programs that develop student abilities to use communication skills, apply core concepts, become self-sufficient individuals, become responsible team members, think and solve problems, and integrate knowledge.

New Teacher Standard VII, Engages in Professional Development. The teacher evaluates his or her overall performance with respect to modeling and teaching Kentucky's learning goals established in KRS 158.6451, refines the skills and processes necessary, and implements a professional development plan.

New Teacher Standard VIII, Content Knowledge. The teacher demonstrates a current and sufficient academic knowledge of certified content areas to develop student knowledge and performance in those areas.

By eliminating the coursework distribution requirements, this new, performance-based system gives colleges and universities considerable latitude in designing teacher preparation programs—which most institutions have been requesting for many years. Teacher training institutions still have their own coursework requirements, of course, which in many cases resemble the previous ones. However, if university officials believe teacher education students were obliged to take too many hours of pedagogy courses and not enough subject area courses under the old system, they can shift requirements to deemphasize the former and reemphasize the latter. Interestingly, some of the universities have already moved in this direction.

To ensure that teacher trainees have adequate content knowledge in their chosen disciplinary areas, these students must attain minimum scores on the Praxis II subject exams. They must also score above a cut-off point on the core knowledge and skill portions of the Praxis II test battery. These minimal competency test requirements, combined with the standards set for entry into teacher education colleges (e.g., minimum 2.5 GPA and 21 on ACT), are the main mechanisms for ensuring that qualified teachers enter the classroom.[34]

[34] Kentucky also has a teacher internship program, known as the Kentucky Teacher Internship Program (KTIP), to provide at least a minimal amount of supervision and guidance for first-year teachers. Arguably KTIP also serves as a means of screening

The role of the EPSB in this new system, in addition to setting standards for new teachers and in other creditation areas,[35] is to supervise the teacher training institutions in their implementation of the redesigned program. Each of the 26 institutions had to submit materials describing how its teacher training component had been or would be altered to reflect the performance-based mandate, and the EPSB had to approve each plan. (Several institutions phased in performance-based programs by 1996, but all had to switch by January 1, 1998.) These institutions are also reviewed for regular accreditation purposes, and the EPSB supervises this process as well. Accreditation standards have not been changed as radically as have other aspects of the training and certification system.

Many people knowledgeable about performance-based teacher preparation and certification in Kentucky and elsewhere believe this new approach will significantly improve the training of educators in the state. The emphasis on demonstrated performance of skills and verification of knowledge levels, these proponents argue, will lead to more capable, versatile, learned, adaptable, and self-reflective teachers in Kentucky classrooms. Indeed, at least one institution in the state has already received national attention for its performance-based program.[36] And Kentucky teacher training programs will likely attract even more attention in the coming years, as NCTAF urges other states to establish performance-based preparation systems similar to the one the Commonwealth has adopted.

Potential Obstacles to Implementing a Performance-Based System

While performance-based teacher training as it is being implemented in Kentucky may well represent a large step forward for the Commonwealth, several obstacles lie in the way of this goal. First, unless a better teacher data system is constructed, it may be difficult to determine how effective the new system is in training teachers and what effects the differently trained teachers will have on the quality of the teacher workforce. Remember, performance-based training has only recently become available, and in schools which have just phased it in during 1997-98, it will be one to two more years before graduates of these institutions begin to enter classrooms.

If KDE continues its current practices for monitoring teachers, we will be unable to tell if they are providing better—or worse—instruction than those trained under the traditional approach. And as these individuals gradually comprise a greater percentage of the teacher workforce, researchers will be unable to tell if improvements in the public school system are due to the new training system. In short, it may not be possible to ascertain whether performance-based training in Kentucky improves outcomes.

Second, this new system relies on teacher training institutions to be, in essence, self-policing and self-correcting. The institutions have described for the EPSB how their performance-based training courses are supposed to function. In addition, Praxis II assessments will provide feedback to institutions and should provide some indication of program effectiveness. But there is no other external mechanism by which EPSB or other organizations or individuals can monitor the teacher training programs. It is not clear, in other words, how institutions that informally set lower performance criteria on the eight new teacher performance standards than others will be identified.

Third, there is a possible conflict between the performance-based approach's move *away* from minimum coursework requirements, on the one hand, and the recommendation of NCTAF and others that middle and secondary school teacher trainees attain at least a minor in the subject areas in which they wish to teach. As suggested earlier, the new system could result in some students taking more academic subject area coursework than under the old system. But it is also possible that some students might negotiate the system without having extensive subject area exposure. Inasmuch as no link has been established between scores on Praxis II subject area exams and different amounts of course-

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out individuals who are not well suited to teaching. However, only about 1 percent of KTIP enrollees "fail" their internship, so the program does not keep significant numbers of new teachers out of public school positions.

[35] In 1994, the EPSB adopted Administrator Standards for Preparation and Certification, and Experienced Teacher Standards for Preparation and Certification. In 1996, it adopted School Counselor Standards for Preparation and Certification.

[36] Verna J. Lowe and Bonnie J. Banker, "Preparing Teachers at Asbury College: Restructuring for the 21st Century," *Changing the Practice of Teacher Education: Standards and Assessment as a Lever for Change*, ed. Mary E. Diez (Washington, DC: American Association of Colleges for Teacher Education, 1998), 51-59.

taking, it is possible that these tests might not screen out students with few subject area courses. If so, then Kentucky could continue to have preparation problems within the teacher workforce.

Kentuckians in school communities and colleges of education also should be prepared for potential difficulties with the performance-based training system. If the past half-decade of experience with KIRIS achievement testing is any indicator, it will not be possible to make such a radical shift in preparation approaches and strategies without making some mistakes. It is not possible to predict what types of problems teacher education in Kentucky will face under performance-based teacher preparation. But citizens and policymakers should prepare for the bumpy road that may lie ahead of those who train new teachers, those who supervise them, and those whose children will be taught by the new teachers.

Finally, it is worth noting that the performance-based approach will not affect the great majority of teachers already working in Kentucky schools, most of whom were trained under the traditional, inputs-oriented teacher training system. Many of these teachers—perhaps the lion's share—have presumably mastered most or all of the skills described in the eight standards approved by EPSB, even if they were not required to meet them explicitly upon completion of their undergraduate training programs. But given that many members of the teacher workforce have lifetime certificates, the performance-based philosophy, for all its promise, will not necessarily change behavior within the teaching force in the near term.

Alternative Certification

Alternative certification as an idea has been around for years, was recommended by the National Commission on Excellence in Education's famous 1983 report, *A Nation at Risk*, and has been implemented on a fairly large scale in New Jersey. Certification rules in most states are such that, even though some individuals might have extensive subject area expertise and effective communication skills, if they do not have many hours of undergraduate teacher training credits they cannot easily be certified and teach. Rather than force such well-educated individuals who would like to teach to take one to two years of college classes (usually in pedagogy and methods) before granting certification, alternative certification programs typically allow knowledgeable people into supervised classroom settings without imposing all the usual coursework requirements.

The principle of opening teaching to individuals other than traditional teacher trainees seems worthwhile, even if relatively small numbers of people take advantage of the option.

KERA, indeed, included a provision requiring KDE to develop and implement an alternative certification program to help channel second-career professionals or others with knowledge, expertise, and enthusiasm into the state's schools. Since EPSB was established, it has approved and revised alternative certification rules for the state. As of 1997, two alternative certification routes existed. In the first, more traditional route, individuals could be issued one-year provisional teaching certificates if they (1) possessed a BA degree with at least a 2.5 GPA (4.0 scale), or with a 2.0 GPA and "extensive life experience related to teaching;" (2) passed written tests approved by the EPSB; and (3) had been offered employment by the *district in which an alternative training program exists*.

Once an individual has a provisional certificate and is assigned to a school, he or she must go through a three-phase training process. During each phase, the trainee must be supervised and evaluated by a four-member "professional support team" composed of the school's principal, an experienced teacher, a qualified instructional supervisor, and a college or university faculty member from a teacher training program. The first phase involves an eight-week practicum experience, which takes place before the trainee assumes any classroom responsibilities. The second phase includes an 18-week period during which the trainee is assigned one half-time classroom responsibility and works closely with the support team to develop teaching competencies. The last phase includes another 18-week period when the trainee is given full classroom responsibilities, and is monitored on numerous

occasions by members of the support team. At the end of these phases, the support team makes a recommendation to the EPSB regarding the candidate's fitness to receive a regular teaching certificate.

A second alternative route to teacher certification was established by the EPSB following the 1996 General Assembly session. This approach allows anyone with an MA, MS, or Ph.D. in an academic subject area, at least five years' teaching experience at the postsecondary level at an accredited institution, and who completes the requirements for Kentucky's one-year internship program, to be given certification for teaching at the secondary school level in the subject area in which they have been trained. Hence, experienced college or university faculty members may have access to high school teaching jobs without any preservice requirements.

Even though these alternative certification routes have been in place for several years, relatively few individuals have become teachers in Kentucky through them. There appear to be at least two reasons that this has been the case. First, due either to lack of interest in alternative certification programs on the part of teacher training institutions and school districts, to the bureaucratic requirements involved in establishing such programs, or some combination of these factors, only three alternative programs have actually been created to date—and one of these has just closed its doors.

Second, KDE has chosen to use the alternative certification programs established to encourage minorities to enter the teacher workforce. It is certainly the case that minorities are underrepresented in Kentucky's teacher workforce. As of early 1997, for example, only 3.5 percent of Kentucky's 39,568 teachers were black. Blacks comprised 7.7 percent of the total population of the state in 1996, but minority elementary and secondary *students* account for almost 11 percent of all Kentucky school children. As of the 1997-98 school year, however, only about 100 individuals, all but a few of them minorities, had received certification under the state's alternative certification programs.[37]

During the 1998 session, the General Assembly passed SB 265 which provides additional alternative certification options. Based on this legislation and regulations written to implement it, individuals with a 2.5 minimum GPA from their college years, a bachelor's degree, 10 years' "exceptional work experience," and an offer of a secondary school teaching job, can obtain EPSB approval to receive a provisional teaching certificate and enter the KTIP program. Upon successful completion of an internship year, an individual so certified may receive the type of provisional certificate possessed by someone who has completed a college of education program.

Indeed, the "exceptional experience" route as called for by SB 265 seems likely to have a greater influence on alternative teacher recruitment than the previously existing programs for at least two reasons. First, interested individuals are no longer limited to teaching job offers in the districts with established alternative certification programs. And second, individuals certified under this approach are paid commensurate with their education and experience levels, not at entry levels.

Again, how many individuals will seek teaching jobs through this new alternative route is unclear. The principle of opening teaching to individuals other than traditional teacher trainees seems worthwhile, even if relatively few people take advantage of the option. Inasmuch as new people will be entering the teacher workforce via these alternative routes, though, it would seem more prudent than ever to create a data system for tracking alternatively certified teachers as well as others.

Professional Development Issues

Teacher professional development, which used to be called in-service training, has already been mentioned at several points in this report. While this study is not the best forum for exploring in-depth a range of professional development issues, the subject nevertheless warrants comment, and is also addressed in the final chapter. Indeed, professional development is one of the few routes by which teachers already in the workforce can increase their skill and knowledge.

[37] As of the 1992-93 school year, minorities comprised more than 25 percent of the student populations in nine of Kentucky's school districts, and five other districts fell just short of the 25 percent mark. In none of these 14 districts, however, did minorities constitute a greater number than did Jefferson County's 15.5 percent of the teaching force, and most averaged only 5 to 6 percent minority teachers.

The Kentucky officials who created KERA recognized the crucial role that professional development activities would play in the success or failure of the massive school reform initiative. Accordingly, the 1990 reform legislation included significant increases in professional development funding, increases that have been sustained over the years by the General Assembly. During the early years of reform implementation, the legislature directed that professional development funds be used to train teachers and principals about the KERA approach to reform itself. Since 1994, it has given schools and districts greater autonomy in spending those dollars.

Professional development in Kentucky has improved considerably under more direct teacher control and at higher funding levels. But the system needs to improve still more, both to focus more on content knowledge and to shift toward the types of ongoing professional development activities that lead to changes in teaching behaviors.

Kentucky's fiscal effort on this front compares well with that of other states. During the last biennium, Kentucky has been spending some $14.5 million of the state education budget on professional development, or about $23 per student.[18] A recent survey of eight southern states shows Kentucky's expenditure level on professional development surpassed only by that of Georgia and North Carolina, both of which have larger cadres of teachers. Kentucky has also been receiving several million dollars per year in federal funds for professional development, and in 1996-97 this added over $9 million to what the state spent.[19] Moreover, some school districts also supplement state and local expenditures.

Legislators concluded that decisions about professional development should be made at the local level. KDE allocates 65 percent of the state professional development funds to local schools with operating school councils (which includes all but about 90 statewide). Those councils decide, in consultation with the schools' professional development committee, what training to "purchase" during the year with these funds. The remaining 35 percent of state professional development money is routed to district offices, which may in turn sponsor their own professional development programs for teachers in their districts.

Hence, in terms of increasing professional development funding and vesting control over services at the school and district levels, Kentucky has made considerable strides in the reform era. However, as with other teacher workforce issues, KDE itself has very little good data about the scope and quality of professional development services being provided around the state and no way to assess the impact—positive, neutral, or negative—of professional development. The KDE division that oversees professional development provides information to schools about some training providers, but beyond that it has little influence on the system. Nor does KDE have either the staff or capacity to assess the impact of professional development offerings or to determine if these offerings best suit the needs of Kentucky teachers.

The data available on professional development in Kentucky are difficult to assess, given that some of it is relatively old, and some is based on field research that is informative but not easily quantifiable. In terms of the former, the 1993-94 SASS study cited several times earlier included some analysis of professional development information nationally and in Kentucky. As shown in Table 15, SASS data show that Kentucky teachers are participating in professional development on

[18] Of the $23 per student total, KDE retains $2 per student for statewide professional development purposes. The rest is funneled to districts and schools.

[19] KDE does not calculate how many nonstate dollars are devoted to professional development. Although districts do report to KDE how they spend their federal grant monies, the Department does not keep tallies of these expenditures that would allow statewide categorical spending breakdowns. During 1996-97, for example, just over $121 million in federal Title I compensatory education funds flowed from Washington to all but one of Kentucky's 176 school districts. Districts can use some of this money for in-service training, but how much is spent for this purpose is unclear. Similarly, Kentucky received $5.51 million in Title IV, Alcohol, Safe, and Drug Free Schools program funds. KDE has not determined, however, how much of this money was spent by districts for professional development, although presumably some portion of the total amount was dedicated to this purpose.

important topics at a considerably greater rate than their counterparts in most other states. This is generally encouraging news and shows both how schools, districts, and the state are responding to KERA's various foci, and how the state's expenditures on professional development are being put to appropriate use.

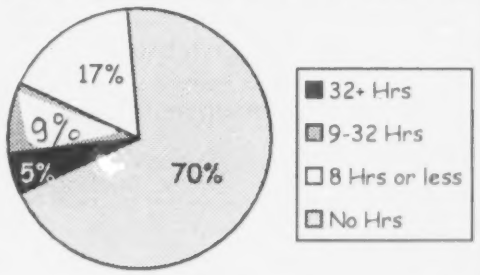
TABLE 15
Percentage of Teachers Who Participate in In-Service Training

Averages	Uses of educational technology for instruction	Methods of teaching in their field	In-depth study in their subject	Student assessment	Cooperative learning in the classroom
U.S.	49.4	64.0	30.0	51.4	50.9
Kentucky	75.0	75.3	36.9	87.3	73.1

Note: These numbers reflect the percentage of teachers who had participated in an in-service or professional development program that focused on various topics since the end of the last school year, 1993-94.

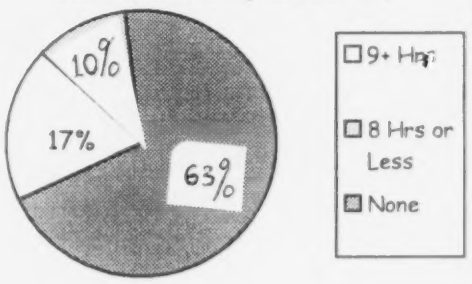
Inasmuch as subject matter content should be emphasized in professional development activities, the numbers are a bit less encouraging. In Kentucky, as just shown, teachers are getting more subject matter training than teachers nationally. But most professional development for teachers at the time these data were collected was still focus d primarily on issues such as new teaching methods, use of technology in classrooms, achievement testing, and elements of KERA. These are important topics but would not typically strengthen teachers' subject matter knowledge. Nor should these findings be especially surprising. During the first several years of KERA, legislation mandated that most professional development in Kentucky concentrate on the components of the reform act itself. More recently this mandate has been removed. But it is unclear what shifts have taken place in the focus and approach of professional development.

FIGURE 10
Professional Development in Teachers' Subject Matter, by Hours Eight Southeastern States (1993-94)



Source: 1993-94 SASS, NCES

FIGURE 11
Professional Development in Teachers' Subject Matter, by Hours, Kentucky (1993-94)



Source: 1993-94 SASS, NCES

More recently, a group of researchers[40] sponsored by the Prichard Committee and the Partnership for Kentucky Schools, and funded by the Pew Memorial Trust, has spent several years studying the evolution of professional development in the Commonwealth under school reform. These researchers

[40] The research team included Bill McDiarmid, University of Alaska; Jane David, Bay Area Research Group; Patricia Kannapel, Appalachia Educational Laboratory; Tom Corcoran, Consortium for Policy Research in Education; and Pamelia Coe, Appalachia Educational Laboratory.

recently summarized the findings of their first year of work, which are reprinted in Appendix C of this report. They have concluded, among other things, that professional development in Kentucky has improved considerably under more direct teacher control and at higher funding levels. But the system needs to improve still more, both to focus more on content knowledge and to shift toward the types of ongoing professional development activities that change teaching behaviors.

These researchers have received funding to continue their studies of professional development, so the work of this group should be able to inform policymakers in Kentucky about options for the future. Others within the state will also be studying professional development issues over the next year or two. KDE has been crafting a reorganization plan which includes a component to revamp the regional service centers to provide more information about professional development activities to schools and districts. Likewise, the State Board is reviewing the professional development situation in the state.

These efforts will likely help state decisionmakers determine how best to shape the professional development system to strengthen the teacher workforce, and this report will not offer a laundry list of recommendations related to professional development. It is worth noting, however, that a vital professional development system will be *crucial* to strengthening the teacher workforce, given that the salutary changes in teacher preparation and certification policy made in recent years only affect newly trained educators.

Moreover, a strengthened—and substantially expanded?—professional development system in the state needs to be linked with the previously cited comprehensive data system on Kentucky teachers and schools. Only through systematic efforts to gather information on the performance of students, teachers, and schools can policymakers and school communities determine their greatest professional development needs. If teacher knowledge and skill needs are not determined properly, and if appropriate professional development to meet those needs is not supplied in a manner that improves teacher and school community behaviors, the best professional development providers in the nation will likely waste huge quantities of resources engaging in fruitless efforts.

Conclusion

Policy changes designed to improve the teacher workforce in Kentucky will therefore have to be made within the context of an exceedingly complicated arena of conventions, traditions, and dynamics. For example, the Commonwealth is facing the retirement of a considerable portion of its teaching force over the next few years. This prospect provides both opportunity and peril. Though the state does not seem likely to face severe shortages of properly certified teacher candidates, some school districts may have trouble filling positions. This situation could be intensified if policymakers promote an otherwise strategically sound policy of increasing academic subject knowledge expectations or coursework requirements for middle and high school teachers. The combination of these factors could thus provide teaching opportunities for many newly trained, talented, and knowledgeable individuals to enter Kentucky classrooms. But potential shortages might prompt some local officials to hire underqualified individuals who would in turn hamper educational efforts at some schools for many years to come.

Likewise, policymakers might wish to move forward on the teacher salary front. But doing this across the board will be very costly to state and local coffers. It might also have unpredictable results in terms of teacher workforce dynamics, and might not, in fact, yield the desired outcome of attracting the most gifted individuals into classroom careers. Indeed, policymakers need to proceed here with extreme caution.

The teacher education system, on the other hand, is already in the midst of dramatic changes, the effects of which have not become evident yet. Additional alterations would add further turbulence to a system already in flux. Two other issue areas, the alternative certification program and the state's professional development system, are also undergoing changes that make the impact of potential changes difficult to predict. And connecting all of these issues is an insufficient data system for gath-

ering, maintaining, linking, and assessing information about these various aspects of teacher workforce policy.

That we have seen change and uncertainty in these areas of policy involving the teaching force in the state does not suggest that policymakers should do nothing further to improve the training, certification, and professional development of Kentucky's teachers. It is to suggest, rather, that policymakers and informed citizens be mindful of how limited our knowledge is regarding Commonwealth educators and the social forces that influence teaching and learning in the public school system. Supporting policy changes to build a better teacher workforce will therefore require an uncommon amount of fortitude, foresight, and wisdom as Kentucky moves toward its second decade of experience with systemic school reform.

Photo by Rick McComb, Kentucky Department of Education

CONCLUSIONS AND POLICY OPTIONS

As the previous chapters of this report have illustrated, Kentucky policymakers and citizens will be in a position to make decisions about a variety of teacher workforce policy issues over the next five or ten years. These decisions, whether made by deliberative bodies or regulatory agencies, will profoundly affect the state's teachers and schools. And some decisions will clearly be made. Even a choice to leave current policies, practices, and institutions unchanged would represent a decision.

The time period around the tenth anniversary of KERA, however, would seem to provide a fitting moment to address this range of issues in a proactive, forthright manner. A considerable portion of the teacher workforce in the state is aging, and many veteran teachers will likely be leaving classrooms over the next few years. The openings that result from these and other departures, and from additional hiring opportunities in some areas provide an opportunity for individuals with deep and broad training to enter the teacher workforce. Identifying and attracting the most promising people for these positions, though, will be the challenge, as will the task of rewarding them for their work and creating better incentives for them to excel as professionals.

According to the evidence available, the teacher workforce is in sound shape, at least as it is compared to teacher workforces in other states. Kentucky teachers on average have ample levels of experience and education, at least in terms of graduate degrees, and the elementary school teaching corps in particular seems to be fit for the task before it. There is no significant problem in the state associated with emergency certification. And the individuals who have recently entered the state's teacher training institutions are above average students.

The issue before policymakers, therefore, does not seem to be one of addressing a crisis. Rather, it is one of moving more purposefully and systematically toward creating a teacher workforce that is best equipped to take Kentucky's schoolchildren to higher levels of academic proficiency in the next decade.

However, the data also indicate that some proportion of middle and high school teachers may not have studied the academic subject matter they teach as extensively as they probably should have, although there is no way at the moment to tell how serious this problem is, how it is distributed around the state, and what its effects are on student achievement. Student test scores, on both KIRIS and NAEP examinations, have been improving modestly, which suggests basic teacher competency. But test scores and other performance indicators have not been rising rapidly enough to meet the ambitious educational goals set for the state in 1990, and suggest that more work needs to be done to improve teacher knowledge and skill levels.

The issue before policymakers, therefore, does not seem to be one of addressing a crisis. Rather, it is one of moving more purposefully and systematically toward creating a teacher workforce that is best equipped to take Kentucky's schoolchildren to higher levels of academic proficiency in the next decade. Current policies do not seem likely to move us as rapidly in this direction as KERA directs.

Nor is this an issue of blaming the state's schoolteachers for deficiencies. Kentucky's educators have prepared themselves and functioned as they have been asked to under guidelines and procedures

that have evolved over the decades. They have also labored under a host of social, cultural, and economic constraints that are typical of largely rural, underdeveloped states of the southeast. However, Commonwealth political, business, and civic leaders in 1990 committed themselves and their resources to the creation of one of the best public education systems in the nation. This will not likely be accomplished through increased expectations and accountability for students on the one hand, but complacency toward serious improvements in teacher knowledge and skill levels on the other.

Granting that complacency toward teacher workforce issues will not move the state's education system in the right direction, it is also the case that policy options for workforce improvements are neither easy to see nor to implement. We must remember, for example, that Kentucky's nearly 40,000 teachers are integral members of thousands of the state's communities. They serve those communities for modest salaries, put up with a host of restrictions and complaints, fulfill the commitments we ask them to make, and play by the rules we have set for them. The rules for and expectations of teachers cannot simply be changed over the course of a year or two. Also a range of structural and cultural issues is tied to difficulties cited earlier in this report. The problem of underprepared math teachers, for example, in part reflects historical differences in certification requirements, but also, and perhaps more importantly, reflects the fact that few Kentucky undergraduates choose to major or minor in mathematics. And of those who do, not many pursue teaching careers. This is a broader problem, although it also affects the number of math teachers in the state. Therefore, addressing issues such as underpreparation in academic content areas and teacher recruitment will have to be done through an array of well-funded, high-capacity support systems.

This report does not provide a laundry list of discrete recommendations for teacher workforce improvement—that task should be undertaken jointly by KDE, stakeholder groups such as the KEA, activist groups such as the Prichard Committee, and an array of insiders and outsiders. Indeed, the process of critical evaluation of the state education system and reform, which occupied much attention in the years that led up to KERA, should be ongoing. This chapter will, however, discuss a broader range of areas within which more specific recommendations should be targeted. Specifically, improvements could be most efficacious if made in data gathering and creating a system to improve the teacher workforce.

The Comprehensive Education Data System

A key theme of the previous chapters has been the lack of data by which to assess the teacher workforce or to make intelligent policy choices about Kentucky's teachers. Inasmuch as the need for better data has been stressed in several places above, a primary policy option that might be considered would be the creation of a comprehensive data system to track teachers in the workforce. The purpose of such a system would not be punitive, to single out individuals for censure, and would therefore have to be carefully crafted so as to avoid its use in that manner. It would be constructed, however, to ensure that teachers are being properly deployed given their training and backgrounds, to determine what types of professional development and educational support teachers need, to gauge supply and demand imbalances, and to ascertain what combination of teacher knowledge and skills has the greatest impact on student achievement.

Until we learn more about these things through a well-designed data gathering program operated over several years—and with information accumulating on the knowledge and performance levels of all teachers in the system—officials will be obliged to tinker with the system based on personal beliefs, experiences, and intuitions, as well as possibly contradictory input from constituents and special interest groups, rather than empirically verifiable information. Moreover, unless the right kind of data system is put in place, subsequent efforts by other individuals or organizations to determine the status of the teacher workforce in Kentucky will continue to come up short in terms of policy-worthy information on this topic for legislators, state officials, educators, and interested citizens.

Creating a comprehensive data system and, as noted earlier, establishing outcome measures for teachers, not to mention principals, superintendents, even local board members, council members, and others, seems to be a next logical step in the KERA-inspired shift away from inputs and toward

demonstrable outputs and accountability. It may also be that as new data about teaching and learning from such a system become available, they will spawn new fervor about how to improve the common school system, much as the student achievement data that became available in the late 1970s helped drive the school reform movement of the mid to late 1980s.

Moreover, if educators and policymakers become dissatisfied with current data on teachers, for example Praxis and ACT scores, and begin to focus on new indicators that might emerge through a comprehensive data system, then incentives will abound for researchers and officials to develop better, more meaningful indicators of teacher knowledge and skill levels. These should, in turn, help Commonwealth leaders make even more informed decisions about the recruitment, training, certification, and professional development of teachers.

The data system could also be constructed in such a way that teacher entry and exit from the profession in Kentucky could be continuously monitored, as could information about district and school hiring needs, teacher demographics, certifications and content expertise, and about students who are in the teacher training system. Analysis of such data should help officials create reliable models to project teacher shortages or surpluses, and as a result Kentucky should be much better positioned to close gaps before they present problems. If chronic shortages were uncovered by this process, either subject specialties or schools and districts, then lawmakers could design incentive programs to attract prospective teachers to those academic disciplines or locales. In addition, teacher retention data could uncover for policymakers the key concerns of those who are leaving the profession at strategic points in their careers, and, again, incentives or policy changes could be generated in response.

Establishing outcome measures for teachers, not to mention principals, superintendents, even local board members, council members, and others, seems to be a next logical step in the KERA-inspired shift away from inputs and toward demonstrable outputs and accountability.

It is beyond the scope of this report to articulate fully what a comprehensive data system should look like. At a minimum, however, it should include information for each teacher regarding undergraduate and graduate courses taken, scores from various achievement tests, indicators of teaching acumen, records of professional development activities, and a listing of grade levels and courses taught. As the CATS system is developed and enhanced, it might eventually provide crucial information about the relationship between student academic progress and teacher preparation and professional development in Kentucky. Given the variation in student characteristics from class to class and year to year, it would not be fair to judge individual teacher performance based on annual test scores. But if teacher and student or classroom level data were gathered and compiled over several years, researchers could determine which training and professional development characteristics of teachers were most directly associated with increased student achievement. This information could be used to help teachers and school officials choose improvement routes or remediation strategies for schools and districts.

Creating a Supportive System for Teacher Workforce Improvements

To create a system to improve the teacher workforce, policymakers should concentrate on reforming the professional development process and pre-service teacher training, and address the complex issue of salaries. These are not rank-ordered in terms of importance. Nor do we go into great detail about how these might be implemented, how much all of them might cost, or how difficult it might be politically to obtain their approval. It is likely to be the case, however, that a variety of policy options will need to be focused upon simultaneously. Picking one or two ideas to implement and leaving aside others—as has often been done in the past—may not be sufficient to upgrade the teacher workforce by the degree necessary to improve substantially student achievement.

Professional Development Reform

The new performance-based teacher training system currently being phased in has generated considerable enthusiasm inside and outside of Kentucky. Below we will address some options for ensuring that this system lives up to its promise. However, we must remember that this new system will apply only to new teachers. Given the turnover rate among Commonwealth teachers, even in times of higher-than-usual retirements, well over a decade will pass before most teachers in the workforce will have been trained under the new regimen.

Hence, if Kentucky policymakers are interested in targeting teacher knowledge and skills in a manner that will affect student achievement in 1999 or 2000, rather than 2014 or 2015, they will need to focus their efforts on educators who have already been in the classroom, some for many years. This will have to be done primarily through the professional development system, though, and the evidence is that system is currently ill equipped to take on this task. During the first years of KERA, professional development efforts aimed at educating teachers about the reform plan. More recently emphasis has shifted, at the behest of teachers and districts, to so-called curriculum alignment or an attempt to alter school curricular materials to reflect more closely the knowledge and skills expected on KIRIS or CATS assessments (based on research findings of the Partnership for Kentucky Schools' group research, summarized in Appendix C). This appears to be a useful shift, but not one likely to broaden and deepen teacher academic knowledge and teaching skills sufficiently to move large numbers of Commonwealth novice and apprentice students into the proficient category.

Kentucky's professional development system could be moved in a more productive direction, but to do so would likely require a concerted state policy effort as well as a variety of incentives to attract—or create—high-quality providers to deliver a program solidly grounded in academic content. These providers would be expected to demonstrate evidence of effectiveness and deliver programs where they are needed with maximum follow-up and personal involvement.

Kentucky's professional development system could be moved in a more productive direction, but to do so would likely require a concerted state policy effort as well as a variety of incentives to attract—or create—high-quality providers to deliver a program solidly grounded in academic content. These providers would be expected to demonstrate evidence of effectiveness and deliver programs where they are needed with maximum follow-up and personal involvement. An array of issues are involved here that warrant lengthier attention elsewhere. Many teachers have complained that they would like to take college-level courses in math and science, for example, but that they either do not have access to postsecondary institutions or the institutions that are nearby do not offer the types of courses they need at a time that is convenient for them. These are problems that might be addressed in part through technological means. But there may also have to be additional policy changes made by Kentucky's State Board of Education, Council on Postsecondary Education, as well as colleges and universities, such that disciplinary experts in those institutions are obliged or encouraged to be more responsive to the needs of the state's middle and secondary school teachers.

An effort to make more content-rich professional development options available would need to take into account several additional factors. First, a scattershot academic content approach would not likely be as effective as one focused on Kentucky's Core Content for Assessment materials. These are the items from the state curriculum that all students should know and that are being tested by the state assessments (first KIRIS and soon CATS). It would make sense to construct an academic content knowledge system to ensure that all teachers have a firm grasp on this material. The system could then expand to ensure teacher knowledge of the rest of the curriculum and of additional discipline or

subject area matter as well. Content knowledge would also be more effectively learned, suggests the research on this topic, when combined with solid information about the best strategies for teaching such material. This issue will have to be addressed by a truly effective professional development system.

Another key factor is the use of teachers' time for professional development activities. Currently, teachers have four days built into their contracts for professional development. This is generally acknowledged to be far too little time for useful continuing education, given demands on teachers' time during the school year and that one-time workshops are the typical professional development approach taken during the available time. The issue here is not just to allocate more time to professional development—which will entail paying teachers for additional days of work—but to determine how best to use and allocate that time. Under a reformed training system, teacher professional development could take place during summer breaks or special breaks between semesters created specifically for this purpose, or on an ongoing basis, depending upon the needs and schedules of teachers.

A third and related issue involves the geographic location of those who provide professional development training and services. A key complaint for years from school personnel, especially those in more isolated rural areas, has been that providers are simply unavailable to address individual school or district professional development needs, even with relatively ineffective one-time workshops. Given the strong research evidence that the most effective professional development is provided over time, by trusted individuals who are nearby and available to provide an array of training and follow-up activities, it is likely that new kinds of networks or institutions will need to be established to meet professional development needs. Also required are incentives within a reformulated system to prompt teachers to engage in additional subject area studies. For example, some teachers may wish to take additional college level subject area courses rather than engage in professional development activities, but may be unable to afford the fees. The State Board and KDE have recently altered rules to spend professional development funds to cover such courses. But many teachers have not yet begun to take advantage of these new opportunities. The state might also loosen up policies so that a greater variety of academic enrichment activities fulfill state professional development requirements. And salary increments could be tied to demonstrated improvements in academic content knowledge, rather than simply fulfilling generic continuing education requirements. For teachers who need additional subject matter training but refuse to respond to learning opportunities, the incentive structure might have to function differently.

A related set of incentives might need to be developed to enable teachers to assess their knowledge and skill deficiencies more honestly. Currently, while teachers must be periodically evaluated by principals, no examinations are given to teachers to assess their knowledge and skill levels once they enter the classroom. Perhaps this is as it should be—the backlash against the institution of such tests in other states, most recently Massachusetts, has been considerable. Nevertheless, state leaders might consider assessment tools of some sort, which might be part of the previously mentioned comprehensive data system, to help teachers determine for themselves which areas of their expertise need the most attention—and to do so without the fear that such information will somehow be used against them. Without such a system, there will be no systematic method of determining priorities for a continuous learning program that stresses content knowledge.

Obviously, such a system differs dramatically from what currently exists and would presumably be costly to implement. Without an effective and substantially redesigned professional development system, however it is ultimately constructed or which model or models are followed, it is hard to see how the Commonwealth will be able to meet the content knowledge and pedagogical needs of her nearly 40,000 teachers.

Pre-Service Teacher Training

As discussed earlier, the performance-based teacher preparation system being phased in seems to improve on the previous approach, which relied too heavily on pedagogy coursework and did not adequately ensure instructional competence or content knowledge. However, policymakers might still

consider whether the new system will guarantee high levels of academic subject area competence, especially among those planning to teach at the middle- and high-school levels. It is difficult, for example, to tell currently if minimum cut-off scores for subject area Praxis tests are adequate for determining knowledge levels. It is also difficult to know which teacher training institutions are doing an acceptable job of preparing prospective teachers in subject area knowledge. Input or accreditation data exist on the institutions, but not output or performance measures of the sort that would enable legislators, policy analysts, or prospective teacher training students to judge the quality of the various programs.

It is also difficult to tell if teacher education programs, particularly in the eight state universities, are funded at an appropriate level to carry out performance-based education, and in general to prepare teachers for excellence in the classroom. Among teacher policy circles in Kentucky it has been conventional wisdom that university teacher training programs bring in more revenue than they are given in their budgets, and that training teachers is funded at a considerably lower level than training dentists, doctors, and many other professionals. Research from at least one other state has confirmed this, but too little data is available at present to make judgments about the funding of teacher education in Kentucky.[41] This is certainly an issue that warrants serious attention by policymakers.

State officials and others might also engage in a public dialogue about what it means for teachers to be well prepared to teach a particular subject. If Kentuckians agree with the National Commission, for example, that middle or high school teachers should major or minor in the academic subjects they teach, then the EPSB could require teacher training students to major or minor in subject areas in which they are seeking certification. The EPSB could also require previously certified teachers to demonstrate adequate content knowledge, via professional development programs or completion of university courses. It could also oblige teachers who have demonstrated subject mastery to continue broadening their content knowledge through various means, under the assumption that this ongoing learning process will help teachers remain intellectually nourished and continue to stimulate student minds. These changes could likely be made, it might be noted, without overly regulating the teacher training programs that have recently been streamlined. The larger point, however, is that state leaders might consider addressing forthrightly the issue of what defines teacher competence in content area knowledge. If they do not, they risk continuation of the debate over the extent of out-of-field teaching in the Commonwealth.

State leaders might consider addressing forthrightly the issue of what defines teacher competence in content area knowledge. If they do not, they risk continuation of the debate over the extent of out-of-field teaching in the Commonwealth.

In sum, teacher training in Kentucky, both for pre-service and in-service teachers, could be turned into a bona fide lifelong learning system. Teachers would understand early in their careers that they would always be active, reflective learners, and they would have a range of formal learning options to pursue during their careers. They would be rewarded in terms of salary, recognition, and leadership opportunities as a result. This process would strengthen the entire school community.

Teacher Salaries, Career Paths, Recruitment and Costs of Reforms

It is hard to imagine that a coherent, well-designed package of reforms to improve teacher quality would be taken seriously without some commitment to more lucrative teacher salaries. Based on our projections, it appears that an effort to raise the average teacher salary to that of the nation would cost several hundred million dollars over the course of a decade. And this scenario assumes modest

[41] See Richard Howard, Randy Hitz, and Larry Baker, "Comparative Study of Expenditures Per Student Credit Hour of Education Programs to Programs of Other Disciplines and Professions." Paper prepared at Montana State University-Bozeman, Fall 1997.

inflation and otherwise modest salary increase levels. Before any policy move of this sort took place, given the fiscal resources involved, there would have to be extensive public discussion and ample political debate over the issue.

Based on historical and political experience in Kentucky, it seems unlikely that a policy debate involving across-the-board teacher pay increases alone will bear much fruit. Rather, as with the debate over the policy package that became KERA, teacher salary increases might be approved as part of a broader range of reforms. Such a plan might focus, for example, on multiple career "tracks" within elementary and secondary education, each of which would have different learning requirements, time commitments, and professional goals. Currently, all teachers follow roughly the same route through the profession, regardless of their interests and dedication. They advance through the rank-and-salary schedule by meeting certain education requirements. And those who aspire to higher salary and responsibility levels generally must do so by leaving the classroom and entering the administrative ranks or leaving the profession altogether.

An alternative approach might offer teachers different career options. Some might choose a career route similar to the current or traditional one, wherein the primary commitment is for a nine and a half month contract and advancement occurs through a rank and salary schedule similar to that already in place. One or two additional routes could be designed, however, that offered teachers substantially greater salaries in exchange for longer contracts, work on a greater range of school-based needs (e.g., curriculum redesign, teacher evaluation skills, assessment consulting, troubleshooting), participation in—and provision to others of—more and better subject matter, intensive professional development activities, the assumption of greater leadership roles in school, and demonstrated performance in the classroom and on assessments of various sorts. The idea here would be to marry compensation to a greater variety of educational skills and knowledge in much the same way that the Highly Skilled Educator (HSE) program has done although these career options would be open to a far greater number of individuals than is the HSE program.

The availability of these career and salary options might also attract more talented individuals into elementary and secondary teaching, as well as build within the profession greater incentives to take seriously the idea of continuous—and energetic—lifelong learning.

Teachers would also be allowed to pursue these various routes at different points in their careers and could switch depending upon how their interests, personal development, and life situations shifted. Such a system would perhaps resemble the master teacher approach that was actually embraced in Kentucky in the mid-1980s but never funded. But it would also be broader and involve a greater number of teachers engaging in a greater array of activities to build their knowledge and skill levels. The availability of these career and salary options might also attract more talented individuals into elementary and secondary teaching, as well as build within the profession greater incentives to take seriously the idea of continuous—and energetic—lifelong learning.

A greater array of teacher career options, with higher salaries, increased responsibilities, and better professional development, might also make the profession attractive to a significant number of individuals seeking career changes. As discussed earlier, the EPSB has approved various alternative certification options, although it has done so slowly and with caution. While EPSB's concern that any prospective teacher be properly trained and certified is understandable, it makes sense to continue expanding alternative certification routes on the grounds that this is a wise use of Kentucky's human resources. There is no obvious reason why a decision *not* to enter a teacher training program at age 20 should prevent someone from moving expeditiously toward the classroom when one is 25, 35, 45, or older, and may have much to offer students and school communities.

Indeed, some states are offering "signing bonuses" as recruitment devices for prospective teachers. Massachusetts, for example, recently offered $20,000, payable over four years, to entice individuals into teaching in hard-to-staff, high-poverty schools, and has had an outpouring of interest in the program. If Kentucky instituted a similar system and used such funds either to support college

students in teacher training programs or alternative certification students interested in, for example, a one-year Masters-with-Initial-Certification program, the results could be tremendous.

The cost of such a multicareer route system, and of recruitment incentives programs, along with the necessary support programs to make them all workable, is hard to estimate. It would presumably be great. Yet it seems unlikely that systemic reform of the teacher workforce, like systemic reform of other portions of the state's common school system, will succeed without substantial financial and political commitment by citizens of the Commonwealth.

Conclusion

This report raises a host of issues surrounding teacher policies. It argues that teacher quality issues will likely be prominent on the public and political agenda over the next few years. It presents a range of data on teachers and teaching in the state, although these data are limited in their usefulness. It hints at the complexities surrounding teacher workforce issues and policies. And it briefly sketches the nature of the policy options that might most profitably be pursued. It also provides a relatively brief look at a limited number of issues. Other issues that come into play when we reflect on the teacher policy domain could easily be identified.

The key point with which to end the report, however, would seem to be as follows. Given the importance of this topic to the future of Commonwealth public education, its complexity, the limitations on the data, the interconnectedness of the available policy options, and the need for educators themselves to be personally and collectively invested in upgrading the teacher workforce, the citizens of Kentucky need to become actively involved in a public dialogue about teacher quality. Any teacher improvement policy package that might be effective would need a coherence wrought through much public discussion about the nature of teaching, schooling, and community life. Any such reform effort would also likely be expensive, which would be another reason why it could only emerge from a political process founded upon public discussion of the best and most feasible route to a better teacher workforce. The foundation of such a public debate should be data and information of the sort presented here and of the sort that might be generated by agency officials, researchers, and interest group representatives over the next year or more.

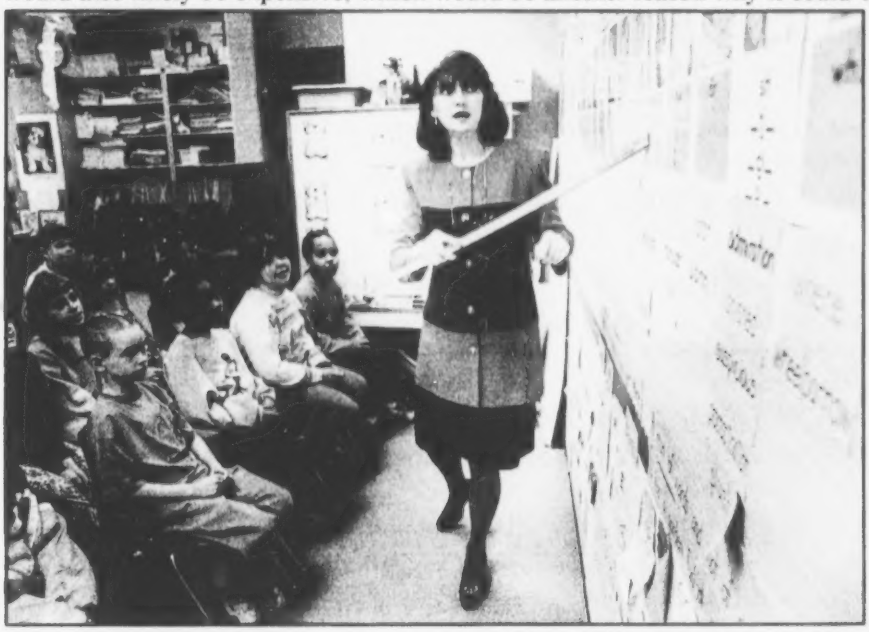


Photo by Rick McComb, Kentucky Department of Education

It is likely, too, that such an effort will be the next logical step in the school reform journey on which Kentucky embarked in 1990. Inasmuch as HB 940 represented a down payment on significant educational improvement in the Commonwealth, then a series of measures to make teaching a profession attractive to a greater variety of gifted individuals and to equip teachers with the skills and knowledge they need to meet KERA's ambitious achievement goals would seem to be a sensible route for policymakers and informed lay citizens to take as we enter a new millennium.

STUDENT ACHIEVEMENT IN KENTUCKY

The performance of Kentucky's elementary and secondary students on various sorts of achievement tests forms part of the context of a teacher workforce assessment. It would be difficult to imagine discussing the effectiveness of Kentucky's doctors without reference to their success in treating patients. Likewise, any responsible analysis of the state's teaching force must include some information about student achievement levels, given that scores from assessments of various sorts are among the primary indicators of the efficacy of Kentucky teachers.

However, the connections between teacher knowledge and skills and student academic achievement levels are not necessarily straightforward, nor are they easy to measure. Commonwealth physicians--to continue the analogy—may treat their patients, but they cannot easily control the population from among which their patients are drawn, or force their patients to take the treatments or medications prescribed. Similarly, teachers must provide instruction to all students, regardless of their socioeconomic background, family support, or commitment to learning. Nevertheless, as noted a few paragraphs earlier, research has shown, and intuition confirms, that teacher skills, knowledge, and capabilities significantly affect student achievement. Shifting achievement levels should therefore be acknowledged as part of any discussion of the Kentucky education system.

Several kinds of data exist regarding academic achievement levels of Kentucky's school children. Not surprisingly, different types of measures reveal different things about student skill levels. Moreover, the measures used to gauge Kentucky students' academic progress have shifted over the years, as periodic changes have been made in the statewide student assessment system. Most of these changes have been made because state officials have been dissatisfied with tests that do not provide school officials, parents, and policymakers with the best information available about academic achievement. Education policymakers in other states have faced the same dilemma regarding student achievement tests.

In the late 1970s, for example, Kentucky officials, along with those in numerous other states, especially in the southeast, participated in the "back to basics" movement. This movement was itself a response to mounting national evidence that standardized test scores were sagging (e.g., the SAT), as well as the perception among growing numbers of Americans that schools had become lax and strayed from their primary mission of promoting basic skills and competencies. In 1978, Kentucky's General Assembly passed the Education Improvement Act, which, among many other things, mandated statewide achievement testing. Hence, efforts to gauge elementary and secondary student progress came to Kentucky.

Norm-Referenced Tests: The CTBS Series

By 1982, the state began administering to students in grades 3, 5, 7, and 10, the Comprehensive Test of Basic Skills, Third Edition (CTBS/3), a test commercially available at the time, produced and marketed by CTB/McGraw-Hill.[42] This particular test was administered thereafter biannually through 1988. Its successor, the CTBS/4 test, was administered during 1989 and 1990, and the

[42] This and additional information about statewide testing in Kentucky can be found in Anthony J. Nitko, *A Guide to Tests in Kentucky* (Frankfort: Kentucky Institute for Education Research, 1997). The KIER executive director prepared a short section found near the beginning of this publication entitled, "A Recent History of Statewide Achievement Testing in Kentucky."

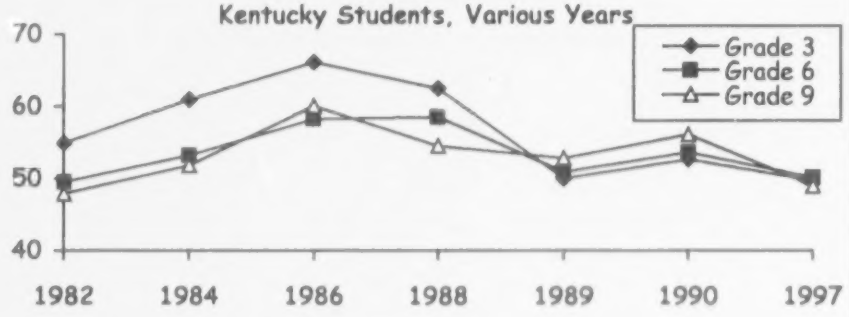
CTBS/5 test was administered in 1997 (as well as in the spring of 1998). The 1989-90 and 1997-98 CTBS assessments were given because of growing dissatisfaction with internally produced tests and to provide better comparisons of Kentucky students to those in other states.

The CTBS assessments are so-called norm-referenced tests. This means the scores of Kentucky students who took the test are not reported based on the number of correct answers but based on how scores compared to those of students in other states. An important factor in such assessments is the year in which the scoring norms are set. Frequently a norm will be set for such a test and then not updated for several years. Consequently, scores may rise farther above the norm as teachers and students become familiar with the test.

Figure A.1 shows scores on these assessments for Commonwealth students. These data indicate that Kentucky school children at various levels have scored close to the national average on the CTBS tests over the years, with elementary students slightly outscoring those at the higher grade levels. Scores on the CTBS/3 drifted upward after 1982, in part because the same version of the test was given and old norms employed—this typically happens under such conditions, and does not necessarily mean students are improving as rapidly as the results suggest. The slightly-below-the-national average scores for 1997 might be due to the administration of the newly normed CTBS/5 test. They might also be accounted for by the long lag time between 1990 and 1997, years when no national standardized norm-referenced tests were given to large samples of Kentucky students. The 1998 CTBS/5 results should be available soon, so a comparison with 1997 scores can be made.

FIGURE A.1

Trends in CTBS Mean Scores, Kentucky Students, Various Years



Source: KDE, Division of Curriculum, May 1998

Criterion-Referenced Tests: KIRIS and NAEP

Exactly how valuable to policymakers, school officials, and parents is the information provided by CTBS-type scores? Such results may assure Kentuckians that their children perform as a group at levels similar to those of students in other states. But the education reform movement has been propelled by the twin suspicions that student performance nationally was much too low and that the norming process employed in standardized, multiple choice tests yielded far too many "above average" scoring states. For those who delved into problems in Kentucky's public school system during the latter 1980s, for example, when that system was being reviewed by state courts, it seemed counter-intuitive that Commonwealth students were scoring near national averages, given documented school problems and funding variations.

Indeed, concerns about the questionable usefulness of CTBS scores for judging students' academic achievement levels were much on the minds of Kentucky education policymakers during this time. During 1989 and 1990, the joint executive-legislative Task Force on Education Reform was

conducting hearings and working toward the school system overhaul known as KERA. Task Force members spent many hours struggling over the problems associated with assessing student progress and consulting with testing experts from around the country.

In the end, the subcommittee on curriculum, and later the entire Task Force, rejected reliance upon norm-referenced standardized tests such as the CTBS, and instead opted to create a performance-based testing system that would be linked to established performance standards and a new core curriculum, use the scoring categories from the National Assessment of Education Progress (NAEP), and drive the state's reward and sanction system. This approach was included in HB 940, the 1990 reform law. The new tests would involve authentic academic tasks—writing and thinking skills—and, inasmuch as they were linked to a core curriculum, would be worth "teaching to."

The assessment system that was created to embody these principles was known as KIRIS, for Kentucky Instructional Results Information System. Enormous amounts of time, effort, and financial resources were invested in developing KIRIS during KERA's first several years. Much work had to be done to create this new testing system and its related components, given that no off-the-shelf assessment tool was available for purchase and implementation in Kentucky.

As noted, the General Assembly stipulated that KIRIS tests be similar to the NAEP tests. NAEP assessments have been given to national samples of 4th, 8th, and 12th grade students since the early 1970s, in subject areas such as reading, history, geography, math, and science. These tests have two primary characteristics. First, they ask students to engage in a range of activities that employ a variety of different types of skills. The test, in other words, is not simply a multiple-choice device. And second, the assessments are scored based primarily on how well examinees fare relative to predetermined performance criteria, not simply in terms of how well all other test takers fared.

NAEP staff use an extensive national consensus process in developing content frameworks for the tests, such that teachers, parents, curriculum experts, and others are involved in determining what students should know and be able to do at different points in their school experiences. NAEP reports score results in several ways, but its most popular method involves classification of the percentage of students who score at one of several different levels: Below Basic, Basic, Proficient, and Advanced.

The creators of the KIRIS tests borrowed heavily from the NAEP approach. As with NAEP, the KIRIS tests employed multiple choice questions, but also open response questions and other types of assessment tools. KIRIS also employed a scoring system similar to NAEP's: Scores were reported at the Novice, Apprentice, Proficient, and Distinguished levels, which roughly paralleled the score categories of NAEP. It is noteworthy, however, that there is not a complete correlation between KIRIS and NAEP results. KIRIS tests were developed to be an integral component of KERA's school accountability system and were designed to provide useful school-level data as opposed to student-level data. Therefore, KIRIS results primarily provide information about the progress of students at certain grade levels in each school toward the outcomes defined in the Kentucky curriculum framework. NAEP scores, on the other hand, provide information about aggregate student performance vis-à-vis NAEP-defined skills and knowledge.

In addition to creating the KIRIS tests, KERA assessment administrators had to pursue several additional tasks simultaneously for the accountability system to be put into place. One was to turn the learning goals for Kentucky students—identified in the fall of 1989 by the Council on School Performance Standards—into specific learning outcomes.[43] Panels of Kentuckians originally identified and approved a list of 75 "valued outcomes." This list was later streamlined into 6 learner goals and

[43] These goals were as follows: (1) Students are able to use basic communication and mathematics skills for purposes and situations they will encounter throughout their lives; (2) Students shall develop their abilities to apply core concepts and principles from mathematics, the sciences, the arts, the humanities, social studies, practical living studies, and vocational studies to what they will encounter throughout their lives; (3) Students shall develop their abilities to become self-sufficient individuals; (4) Students shall develop their abilities to become responsible members of a family, work group, or community, including demonstrating effectiveness in community service; (5) Students shall develop their abilities to think and solve problems in school situations and in a variety of situations they will encounter in life; (6) Students shall develop their abilities to connect and integrate experiences and new knowledge from all subject matter fields with what they have previously learned and build on past learning experiences to acquire new information through various media sources.

57 academic expectations.[44] The bulk of the expectations that were measured as of 1998 are those which are most subject-oriented in content. Those goals which involve student attitudes and behaviors are not well covered by the KIRIS assessments.[45]

Another task was to develop curricular materials linked to the specified learning goals. This led eventually to the creation of two documents: the *Core Content for Assessment*, which represented the specific material that would be used in developing assessment items, and *Transformations: A Curriculum Guide*, which would cover the core content material but also provide broader curricular guidance regarding the knowledge and skills Kentucky students should have to meet the academic expectations.[46] When these materials were completed, they were circulated to all Kentucky schools.

The creation of the KIRIS tests themselves was undertaken by New Hampshire-based Advanced Systems in Measurement and Evaluation, Inc. (ASME), under contract.[47] These tests have most recently (1997-98) been administered in schools at grades 4, 5, 7, 8, 11, and 12, although in earlier years—1991-92, 1992-93, 1993-94, and 1995-96—they were given only to students in the 4th, 8th, and 12th grades. In the first several rounds of testing, the exams focused on Kentucky's core curriculum and academic expectations in reading, mathematics, science, social studies, and writing. More recently, KDE has added assessments of arts and humanities, practical living, and vocational studies, although too few longitudinal data have been gathered in these areas to provide useful information. The tests originally included both multiple-choice and short-answer sections. Students also prepared writing portfolios, which were graded and included in the calculations for school accountability scores.[48]

According to KIRIS results, Kentucky students made fairly significant progress during the first few years of KERA implementation, both collectively and at many schools. This is especially true with regard to moving large percentages of students from the "novice" to "apprentice" categories, as is shown in Tables A.1-A.3. Schools have had relatively less success, however, in moving students into the "proficient" and "distinguished" categories.

In terms of aggregate KIRIS score averages, Kentucky students made progress between 1992-93 and 1994-95 in most subject/grade areas, but lost ground in 10 of 15 subject/grade areas between 1994-95 and 1995-96. The 1996-97 data showed index score improvement in most areas. But 1997-98 data showed slippage again in some areas (see Figures A.2-A.4).

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[44] The original list of 75 outcomes was revised because of objections raised to a number of the outcomes, which were said to involve affective issues and which would be difficult to teach and assess. Other outcomes were criticized for being too vague or laden with jargon. Moreover, the term "outcomes" was becoming a political liability, and this prompted the renaming of the list as "academic expectations."

[45] Discussed in Joseph M. Petrosko, "Assessment and Accountability," *1996 Review of Research on the Kentucky Education Reform Act (KERA)* (Frankfort: Kentucky Institute for Education Reform, 1997).

[46] The processes involved in accomplishing these tasks—or at least KDE's role in those processes—have been described by former KDE official Betty Steffy in her book *Kentucky School Reform: Lessons for America* (Lancaster, PA: Technomic Publishing Company, Inc., 1993).

[47] Several recent documents have appeared that aptly summarize development of Kentucky's assessment system, the research and analyses that have been conducted, and the student achievement outcomes of these and other tests administered to Kentucky school children in the years since KERA's passage. These materials have been summarized in Petrosko, "Assessment and Accountability." See also Anthony J. Nitko, "A Guide to Tests in Kentucky: A Description and Comparison of the Comprehensive Tests of Basic Skills, the California Achievement Tests, the TerraNova (CTBS/5), and the Kentucky Instructional Results Information System Assessment" (Frankfort: Kentucky Institute for Education Reform, 1997).

[48] Math portfolios were also originally part of the KIRIS plan, but these have been removed because of various scoring problems.

TABLE A.1
Percentage of Grade 4/5 Students by KIRIS Performance

	Novice		Apprentice		Proficient		Distinguished	
Subject	**1992-93**	**1997-98**	**1992-93**	**1997-98**	**1992-93**	**1997-98**	**1992-93**	**1997-98**
Reading	32	5	20	63	8	31	0	2
Math	n/a	28	n/a	53	n/a	11	n/a	9
Science	57	20	42	71	2	8	0	0
Social Studies	43	29	49	55	8	14	0	1
Writing	n/a	30	n/a	53	n/a	16	n/a	1

TABLE A.2
Percentage of Grade 7/8 Students by KIRIS Performance

	Novice		Apprentice		Proficient		Distinguished	
Subject	**1992-93**	**1997-98**	**1992-93**	**1997-98**	**1992-93**	**1997-98**	**1992-93**	**1997-98**
Reading	20	6	69	78	10	15	1	0
Math	n/a	34	n/a	34	n/a	16	n/a	15
Science	54	47	44	52	2	1	0	0
Social Studies	43	35	47	54	9	11	1	1
Writing	n/a	49	n/a	39	n/a	11	n/a	1

TABLE A.3
Percentage of Grade 11/12 Students by KIRIS Performance

	Novice		Apprentice		Proficient		Distinguished	
Subject	**1992-93**	**1997-98**	**1992-93**	**1997-98**	**1992-93**	**1997-98**	**1992-93**	**1997-98**
Reading	57	16	39	56	4	26	0	2
Math	n/a	32	n/a	42	n/a	17	n/a	10
Science	39	8	58	80	4	12	0	1
Social Studies	52	24	42	47	6	25	0	4
Writing	n/a	26	n/a	52	n/a	20	n/a	2

FIGURE A.2

Grade 4/5 KIRIS Averages, 1992-93 through 1997-98

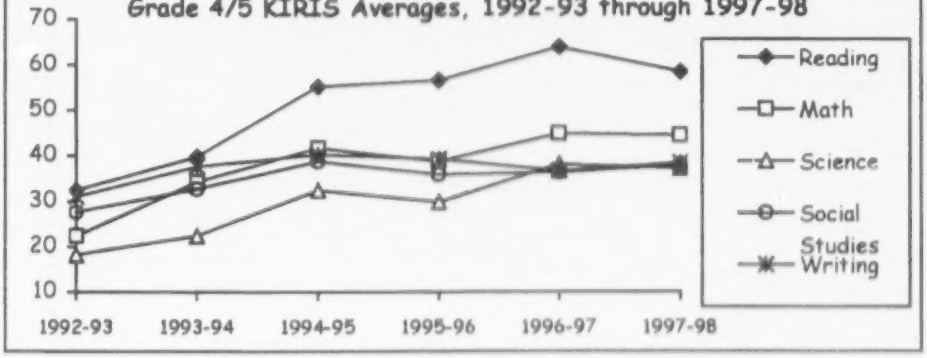


FIGURE A.3

Grade 7/8 KIRIS Averages, 1992-93 through 1997-98

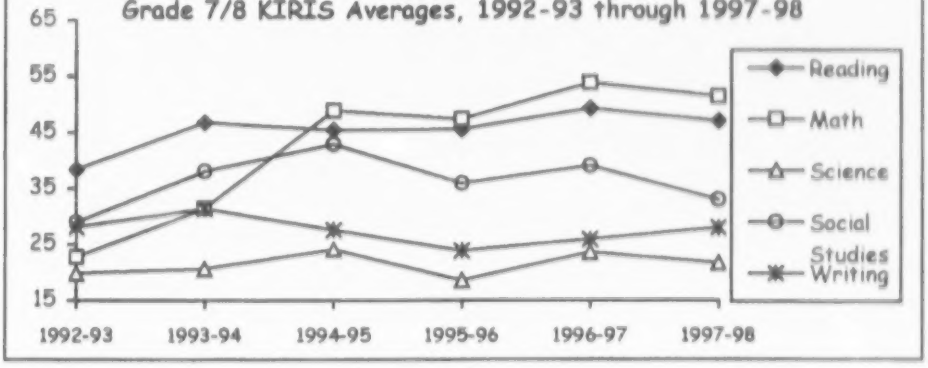
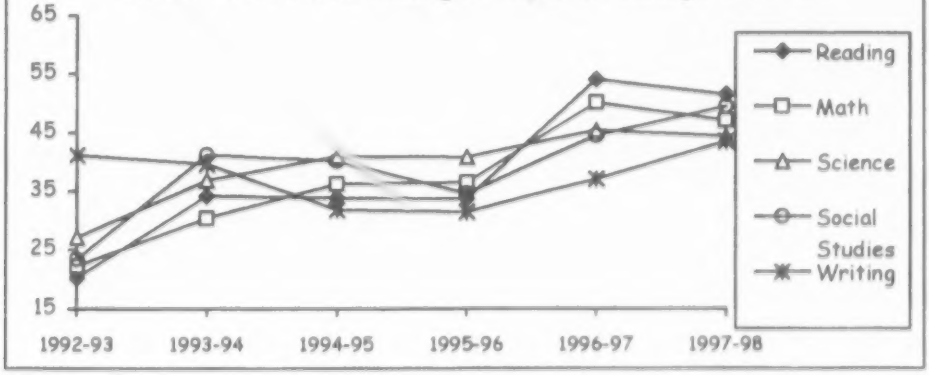


FIGURE A.4

Grade 11/12 KIRIS Averages, 1992-93 through 1997-98



Other tests only partially corroborate the large KIRIS achievement gains reported by KDE during the assessment's first years. Specifically, data from NAEP show Kentucky students making modest progress, but not nearly as much as shown by KIRIS. Beginning in the early 1990s, NAEP assessments began to include large enough samples of students that state-by-state comparisons could be made. To date, assessments with state-level data from NAEP have been conducted at various grade levels in reading, math, and science.

According to the reading and math results—for example see Table A.4—Kentucky students have been making modest progress in those subjects, gradually moving into higher achievement categories. But students elsewhere in the nation are improving as well, with the result that Kentucky students still lag behind national average achievement levels.

TABLE A.4
KY and U.S. NAEP Results in Reading and Math

	Percent Above Basic		Percent Above Proficient	
	KY	**US**	**KY**	**US**
1992 Grade 4 Reading	48	60	23	27
1994 Grade 4 Reading	5.	59	26	28
1992 Grade 4 Math	51	57	14	19
1996 Grade 4 Math	60	62	17	22
1990 Grade 8 Math	43	51	10	15
1992 Grade 8 Math	51	56	14	20
1996 Grade 8 Math	56	61	16	23

Source: NAEP State Reports

NAEP has reported science achievement for its state-by-state results differently than for reading and math. According to the 1996 science report, Kentucky eighth-graders scored very close to the national average. This score placed Kentucky in a cluster of states that included upper tier southeastern states such as Maryland, North Carolina, Virginia, and West Virginia, but also states from other regions, such as New York, Arizona, Rhode Island, Texas, and Washington.

TABLE A.5
NAEP 1996 Science Assessment Summary for All States

Performed Above the National Average	**Performed At or Around the National Average**	**Performed Below the National Average**
Alaska	Arizona	Alabama
Colorado	**Kentucky**	Arkansas
Connecticut	Maryland	California
Indiana	Missouri	Delaware
Iowa	New York	District of Columbia
Maine	North Carolina	Florida
Massachusetts	Rhode Island	Georgia
Michigan	Texas	Guam
Minnesota	Virginia	Hawaii
Montana	Washington	Louisiana
Nebraska	West Virginia	Mississippi
North Dakota		New Mexico
Oregon		South Carolina
Utah		Tennessee
Vermont		
Wisconsin		
Wyoming		

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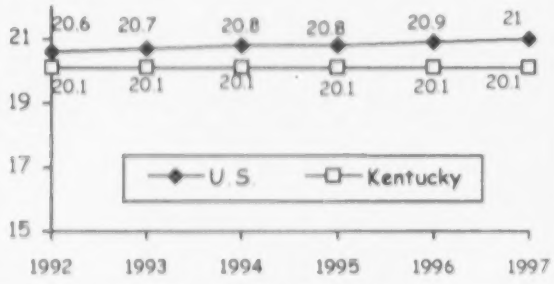
Other Achievement Data: College Entrance Exam Scores

Aggregate ACT scores of college-bound Kentucky high school seniors have been flat for several years, although math and science scores from subsets of Kentucky high schoolers show these students faring better than their peers in other southeastern states.[49]

The ACT scores, reported in Figure A.5, suggest that KIRIS results, at least those reported at the 11th or 12th grade levels, could be mildly inflated. They also indicate that the KERA reforms are having significantly less impact at the high school level. The ACT is not, of course, taken by a random sample of Kentucky high school seniors, but rather those interested in going to college. However, students from other states are self-selected from the same "pool," and hence the results are more or less comparable.

FIGURE A.5

ACT Exam, KY and U.S. Scores



Source: American College Testing Service, Inc.

General Assessment of Kentucky Student Achievement Levels

Drawing conclusions about achievement levels of Kentucky students based on this collection of test results can be hazardous, especially given the discrepancies between KIRIS scores and those of the other tests. As noted, the national standardized test results provide information of limited usefulness, inasmuch as neither the nature of the tests nor their content corresponds to Kentucky's KERA-driven core curriculum and assessment systems. Such tests, or at least those recently normed, have nevertheless found Kentucky students scoring near the national average at most grade levels. This does not tell Kentucky policymakers how well students *should* be scoring, however.

The KIRIS results, on the other hand, do not correspond directly to results on other tests given nationally or in different states. It is therefore difficult to determine how to size up the state's own internal test scores. According to KIRIS reports, with minor exceptions Kentucky students at various grade levels have been making slow but steady progress, at least in terms of moving students from the "novice" to "apprentice" achievement categories. The schools have made relatively little progress, however, in moving significant percentages of students into the "proficient" and "distinguished" categories. Moreover, given problems with the KIRIS system and the inability to match KIRIS results with those from other tests, it has not been possible to verify KIRIS results as well as policymakers within the state would like.

Indeed, in late 1998 yet another critical evaluation of the KIRIS system was published, this one by RAND Corporation researchers.[50] The authors documented in much more detail the disjunction between KIRIS scores and those on selected nationally administered tests. They concluded that features of the KIRIS test administration process and the high stakes nature of the assessment combined to inflate KIRIS scores substantially. They also recommended a series of measures designed to reduce the likelihood of scoring problems in the future.

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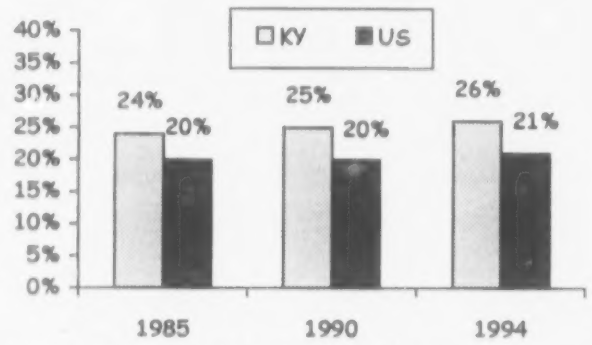
[49] This is the finding of an SREB analysis of data collected on students from Kentucky secondary schools that participate in the SREB's High Schools That Work (HSTW) initiative. In reading, Kentucky HSTW students had an average score of 280, while those in other states averaged 273. In math, Kentucky scores were 292 compared with a regional average of 285, and in science the Kentucky average was 287, compared with 283 elsewhere. KDE press release No. 97-007, February 3, 1997.

[50] Daniel M. Koretz and Sheila I. Barron, *The Validity of Gains in Scores on the Kentucky Instructional Results Information System (KIRIS)*. (Santa Monica, CA: RAND, 1998).

Even assuming some KIRIS score inflation, however, the full array of test scores provide evidence of some academic progress in the state. This is especially so given the large percentages of impoverished students in the state. As Figure A.6 shows, Kentucky has struggled for years with higher-than-average child poverty rates, a fact which certainly has significant educational consequences. In light of these percentages, it should be good news that test results show Kentucky students scoring close to national averages.

On the other hand, the results also show that Kentucky students have a long way to go to fulfill the promises of KERA. According to both KIRIS and NAEP, for example, relatively few Kentucky students perform at the "proficient" level, which is the performance category recognized by many experts as the skill level a student must reach if he or she is to function effectively in school, society, and the economy. Kentucky is to be commended for attempting to create a NAEP-like scoring system, which provides more useful results than does the CTBS. But Kentucky policymakers should also acknowledge that much remains to be done in terms of moving large percentages of students into higher performance categories.

FIGURE A.6
Kentucky and U.S. Poverty Rates Among Children (under Age 18)



Source: Kids Count Data Book, Census Bureau

CATS: The Post-KIRIS Assessment System

Dissatisfaction with various aspects of the KIRIS system led the 1998 Kentucky General Assembly to pass legislation requiring the State Board of Education to revamp the KERA assessment system. The process of creating the new system—to be called the Commonwealth Assessment and Testing System, or CATS—is currently underway, but there is still uncertainty about how different it will be from its predecessor. It is likely that CATS will be quite similar to KIRIS in numerous respects. The new assessments, however, will incorporate additional multiple-choice items from nationally standardized tests, so that Kentucky students can more easily be compared to their counterparts in other states. The tests will also consume less classroom time than KIRIS. New baseline scores for individual schools will also be set, so that it will be several more years before bona fide accountability rewards and sanctions can begin. Other components of the assessment system—for example, the 4th-grade writing portfolios—will also likely be altered. The intention is to create a more reliable and valid assessment, one that is less burdensome on teachers and students and that yields more useful information.

Regardless of the details of the new plan that should emerge soon, the switch to CATS from KIRIS will have two results. First, Kentucky will continue to pursue a largely uncharted and risky path toward useful, performance-based assessments, which will drive the accountability system and pressure schools to ensure that students continue to make academic progress. This will help keep Kentucky on the cutting edge of achievement testing and systemic school reform.

On the other hand, the CATS system, like KIRIS before it, may not be designed to gather data in such a manner that the scores from individual students in individual classrooms can be compared. Instead, CATS data will likely provide school-level information. This type of information should

indeed be useful for making reward and sanction decisions within the strategy enumerated in KERA. But it will not help us measure the academic progress of particular *students.* Nor will it provide information that will help officials determine which types of teachers are particularly effective, inasmuch as this is not currently a mandate for the new system.

KENTUCKY'S TEACHER TRAINING SYSTEM

Kentucky has created a system of performance standards for students which are measured through the KIRIS assessment system. And it is in the process of phasing in new performance standards for teachers. There will be no equivalent to the KIRIS system, however, for measuring the extent to which teachers seeking certification *meet* these performance standards. Instead, Kentucky's teacher training institutions will be responsible for assessment with regard to the performance standards, which could lead to wide variations in professional competencies. At the moment, though, there seems to be no viable alternative to this arrangement. Policymakers in the state will have to presume that institutions prepare teachers adequately to meet the standards and that the array of Praxis tests new teachers must take will ensure at least a modicum of competency.

The next few pages provide basic data about teacher training programs in Kentucky. This is institution-level information that does not reveal the contours of each specific program. Such a summary and analysis would indeed be useful, in that it would provide quality indicators of teacher training efforts at 26 different Kentucky institutions of higher learning. It would also provide Kentucky policymakers with a better sense of the strengths and weaknesses of the teacher training enterprise in the state. But such an inquiry is beyond the scope of this report and will perhaps be included in subsequent NCTAF follow-up activities in the Commonwealth.

Kentucky's Teacher Training System

Most of Kentucky's teachers are trained through education departments and colleges of education at 26 public and private postsecondary institutions around the state. The lion's share of new teachers—around four fifths of the approximately 2,800 teacher education graduates produced each year—are prepared at the state's major and regional universities. But the other fifth are supplied by more than a dozen private colleges in Kentucky, whose graduates also fan out to take teaching posts in many states of the Midwest. Several hundred of the new teachers hired each year in Kentucky are prepared in other states. The tables below contain some basic data for 1995 and 1996 on teachers produced by this teacher training system.

TABLE B.1
Data on Teacher Education Students in Kentucky, 1995 and 1996

Year	# of Students Completing Bachelor's Programs	# of Students Assigned to Internships, KY Institutions	# of Students Assigned to Internships, Out of State	# of Students Completing Post-Bachelor's or Master's Programs	# of Students Admitted to Teacher Education Programs
1995	2700	2152	n/a	549	3418
1996	2917	2234	406	768	3041

Source: Kentucky's Performance Indicators for Teacher Education Programs, 1992-1996. KDE, Office of Teacher Education and Certification, Division of Teacher Education, January 1997.

Based on teacher preparation and employment data from 1996 and on reports of similar trends over recent decades, it appears that Kentucky institutions have been producing more teacher education graduates than there are available new teaching positions in the state, at least in some areas. This

point was made earlier in the discussion of supply and demand data on teaching in the Commonwealth, but this point is reinforced by the above data. As a result, Kentucky's teacher training institutions have contributed significantly to the supply of teachers not just in the Commonwealth, but also throughout the Ohio Valley, at least in part because of this overproduction.

TABLE B.2
Teacher Training Institutions in Kentucky by Bachelor Program Completions

Type of Institution	Number of Bachelor Program Completions	
Public Universities	**1995**	**1996**
Eastern Kentucky University	393	426
Kentucky State University	44	35
Morehead State University	355	461
Murray State University	330	303
Northern Kentucky University	224	197
University of Kentucky	206	306
University of Louisville	103	129
Western Kentucky University	466	488
Sub Total	2121	2345
Private Colleges or Universities	**1995**	**1996**
Asbury	n/a	64
Alice Lloyd	39	28
Bellarmine	21	20
Berea	33	44
Brescia	51	24
Campbellsville	52	54
Centre	20	17
Cumberland	74	79
Georgetown	n/a	n/a
Kentucky Christian	21	26
Kentucky Wesleyan	n/a	10
Lindsey Wilson	35	35
Midway	n/a	8
Pikeville	89	61
Spalding	33	17
Thomas More	23	9
Transylvania	26	20
Union	62	45
Sub Total	579	561
Total	2700	2906

Currently no comprehensive method is available, however, to assess the quality of the students who enter and complete teacher training programs or the programs themselves. In terms of ACT scores, as discussed in Chapter Three, students entering teacher training programs in Kentucky had an average score of 21.6 on the most recent "enhanced" version of the ACT exam. The statewide average score for all Kentucky ACT-takers was 20 over the course of the last several years, which means that teacher education students in the Commonwealth consistently scored above the average of the "typical" college-bound Kentucky high school senior. The ACT average for program entrants in 1995-96 is even slightly above the national average ACT score. Hence, it appears from this particular indicator that Kentucky's prospective teachers are competent students.

Interestingly, there are only slight aggregate differences in the ACT profiles of individuals in Kentucky's private colleges as compared with those in the public universities, which produce most

trained teachers. An analysis of OTEC data shows the ACT Enhanced scores of admitted candidates in 1995-96 for private colleges was 22.04, with an aggregate GPA of 3.18. The public universities in the same period admitted candidates with an ACT Enhanced average of 21.86, and a GPA of 3.14. The institutions with the highest aggregate ACT scores from both categories included Asbury College (23.1), Centre College (25.9), Georgetown College (23.9), Alice Lloyd College (23.5), Transylvania University (24.5), and Western Kentucky University (24.0).

Praxis exams—also discussed in Chapter Three—are given to teacher education students each year to test their general knowledge, professional knowledge, communication skills, and subject area knowledge. Those who score below a certain point on these tests fail them, and if they continue to score below the cutoff level during a set number of subsequent retakes, they are prohibited from receiving certification.

However, the earlier discussion of Praxis scores did not include information about the failure rate on the subject area exams. The failure rate for students in many of these subject areas is very low, which raises the question of how meaningful the cut-off levels used to disqualify aspiring teachers are. According to the document that reports the 1993-94 and 1994-95 Praxis II scores:

> *The passing scores for most assessments in Kentucky are set very low. A very small percentage of students nationally have scores lower than the passing scores set in Kentucky. The perception is that Kentucky's teacher candidates are not competitive nationally because the passing scores are low. The good news is that this perception does not accurately match reality. For the Core Battery (Professional Knowledge, Communication Skills, and General Knowledge) preservice teachers' median is at or above the national median for both years of this report. The bad news is that some students fail these general skills tests after completing approved programs. The average failure rate reported for both years of this report is 4.6% for Communication Skills, 5.2% for General Knowledge and 3.5% for Professional Knowledge.*[51]

Additional information about teacher education student Praxis II scores appears in *Kentucky's Performance Indicators for Teacher Education Programs, 1992 Through 1996*, cited earlier. Disaggregated score results show, among other things, that a substantial score gap still exists between white and minority teacher education students in Kentucky in most subject areas. They also show that students with additional graduate education and master's degrees tend to outscore those with only bachelor's degrees. These findings, together with the fact that persons successfully completing teacher preparation programs are nevertheless failing the core battery tests, suggest areas needing further study.

Accreditation of Teacher Training Institutions

In Kentucky, teacher education programs must be approved for accreditation by the EPSB, and the standards and procedures for the accreditation process are detailed in 704 KAR 20:696. The following are key facts about EPSB accreditation:

- Institutions may obtain NCATE accreditation, but this is only mandatory for state universities. However, the EPSB *uses* NCATE standards in its own accreditation process. Currently 11 of Kentucky's 26 teacher training institutions have formal NCATE and state approval. The rest have only state approval, although as noted these standards equate to those of NCATE.
- EPSB provides an annual accreditation report to approved institutions and authorizes a site visit to institutions every five years.
- Accredited institutions must provide annual reports to EPSB.

[51] Division of Teacher Education, OTEC, *Kentucky's Performance Indicators for Teacher Education Programs 1992 Through 1996* (Frankfort: KDE, 1997) section 2, 58.

- EPSB appoints a reading committee to review and assess portfolios and materials submitted by approved institutions.
- EPSB also appoints a Board of Examiners, which supplies members for site-visit teams.
- Before site visits, institutions must submit reports describing how their programs are meeting performance standards and what changes have been made since the previous visit.
- Also, before site visits can occur institutions must submit program folios describing the teacher training programs, faculty, curriculum, and continuous assessment process.
- After site visits, the Board of Examiners provides a report to the institutions reviewed, and institutions are allowed to respond to those reports.

The EPSB appoints an Accreditation Audit Committee that reviews materials generated through site visits and responses to reports submitted by institutions. If the Accreditation Audit Committee believes an institution warrants reapproval, it can recommend this to the Program and Technical Assistance Committee, which in turn can recommend accreditation to the full EPSB. If the EPSB assents, accreditation is granted or maintained.

Intervention Procedures for Poorly Performing Teaching Training Institutions.

If a site visit or review of submitted documentation by an EPSB subcommittee uncovers deficiencies in any institution attempting to meet standards, the EPSB has several options in terms of remediation.

- It can elect to continue accreditation of the institution, but cite weaknesses in program areas and request that those problems be addressed by the institution in its next annual report to the EPSB.
- It can continue accreditation with probation, meaning serious weaknesses exist within the program, and stipulate that EPSB examiners return to the institution within two years to determine if the problems have been dealt with (although this has recently been changed to one year of probation before a follow-up accreditation visit).
- If an institution fails to make necessary corrections to its program deficiencies within the two- (or one-) year probation period, the EPSB can revoke accreditation.

Past performance reviews show that five institutions did not meet the state teacher education program standards. All five institutions were denied initial accreditation, and the EPSB ordered a review of specified weaknesses within one year. However, all institutions eventually satisfied EPSB accreditors, and all programs have been approved.

Adequacy and Funding of Teacher Training Institutions

As noted, too little data is available to make informed judgments about the quality of teacher training programs at colleges or universities. At the moment, little can be said about these programs beyond that all are currently approved by KDE to instruct teachers according to standards that are essentially those of NCATE.

It might be possible to determine how much revenue is spent on colleges of education in Kentucky, and specifically for preparing teachers. But information would have to be gathered and assessed on an institution-by-institution basis. Colleges and universities tend to approach their budgets differently, and this makes inter-institutional comparisons difficult. Moreover, teacher education students typically receive only a portion of their training in education departments or colleges of education. This makes determining how much Kentucky spends to train teachers even more complex, and renders it all but impossible to determine if the state's expenditures on teacher preparation are "adequate." Such an inquiry would be worthwhile, however, given the information it could yield to policymakers about teacher training in Kentucky.

One indicator of the effectiveness of teacher training programs, at least in terms of how they have prepared their students to meet the demands of KERA, can be seen in the results of a survey

taken of teachers recently hired in Kentucky schools. This survey was commissioned by the Kentucky Institute for Education Research (KIER), and was conducted via telephone in July 1996 by Wilkinson and Associates of Louisville. The survey drew upon a sample of 1,066 first-, second-, and third-year teachers teaching in Kentucky elementary, middle, and high schools during 1995-96.

KIER's report of the study had a range of findings:[52]

1. Overall preparation

About six out of ten teachers with one to three years' experience said they were extremely or very well prepared to teach in Kentucky schools. About an additional one third said they were moderately prepared, while 6 percent said that their college or university had prepared them poorly.

As a group, teachers who graduated from smaller private colleges and universities gave higher marks to their preparation programs than did teachers prepared in state institutions; however, there was considerable variation across both private and state-supported institutions.

In general, teachers prepared by Kentucky colleges and universities felt better prepared to teach in Kentucky's schools than teachers prepared out of state.

Teachers in their third year felt that they were not as well prepared as were first or second year teachers.

2. Preparation for Kentucky's new teacher standards

With regard to Kentucky's new teacher standards, there was a wide variation in reported preparedness. Responses varied from 80 percent stating that they were extremely or very well prepared to *establish a positive learning environment for students*, while only 31 percent felt as prepared to *use technology as an integral part of instruction*.

In general, new teachers felt best prepared to *design and plan for instruction, communicate high expectations, and use different teaching strategies*; they felt least prepared *to use technology in instruction, engage in professional development, provide for diversity among students, address discipline problems*, and *use a variety of student assessments*.

3. Preparation of primary teachers for implementation of the seven attributes of Kentucky's primary program

With regard to the seven attributes of Kentucky's primary program, there were significant differences in reported preparedness. New teachers who taught kindergarten through fourth grades felt best prepared to *design developmentally appropriate practices* and *engage in professional teamwork*. They felt least prepared to *use authentic assessment* and *qualitative reporting*.

The teachers who were trained out of state, as did those who were trained at an in-state institution, felt as well prepared to implement these seven attributes of Kentucky's primary program. The exception was *multiage/multiability grouping* for which 55 percent of Kentucky trained teachers felt extremely or very well prepared compared to only 37 percent of those trained out of state.

First- and second-year elementary teachers felt significantly better prepared to implement all seven attributes of the primary program than did teachers in their third year of teaching.

4 & 5. Preparation of middle and high school teachers for KERA instructional initiatives

Fewer than half of new teachers teaching fifth through twelfth grades stated that they felt extremely well prepared to implement or participate in key instructional practices initiated by KERA. Also, fewer than one in five felt well prepared to participate in *school transformation planning* required by all schools in Kentucky.

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[52] These findings are taken from the executive summary of *The Preparation of Teachers for Kentucky Schools: A Survey of New Teachers* (Frankfort: Kentucky Institute for Education Research, 1997).

As was the case with kindergarten through fourth grade teachers, new middle school and high school teachers who graduated from in-state institutions reported better preparation for key instructional practices initiated by KERA than did teachers prepared out of state.

Also, teachers trained more recently (first- and second-year teachers) felt better prepared for KERA instructional practices than teachers who had completed their training in 1993 or earlier.

6. Preparation of new teachers for major KERA initiatives

All new teachers reported that they were much less prepared to implement or participate in the eight specific programs and practices initiated by Kentucky's school reform law than they were to implement the traditional teaching skills of planning, implementing, and assessing instruction.

Only about one third of the new teachers stated that they were very well prepared to teach *writing portfolios* and *use performance events,* while about one fifth reported that they were very well prepared to make use of *extended school services* or the *family resource and youth services centers* and four out of ten were poorly prepared to implement *Kentucky's education technology system.*

Teachers trained in Kentucky reported higher levels of preparedness than did new teachers prepared out of state. The same was true of the teachers who have been trained more recently as they reported that they were better prepared than were the teachers graduating in 1993 or earlier.

7. Influence of teacher preparation institutions on attitudes toward school reform

About three fourths of the new teachers reported that their preparation program had influenced them in a positive manner concerning KERA. The remaining one fourth reported that their college or university had either no influence or a negative influence on their attitudes toward KERA.

8. New teachers' agreement with beliefs underlying KERA

New teachers were in high agreement with the following principles of operation underlying the design of KERA:

- *We should set high standards for all children* (94 percent agreement)
- *All children can learn and most at a high level* (84 percent)
- *Schools should be held accountable for student learning* (80 percent)
- *Both rewards and sanctions are necessary incentives to encourage high performance in schools* (59 percent)

9. Helpfulness of the Kentucky Teacher Internship Programs

New teachers gave high marks to the Kentucky Teacher Internship Program and to the members of their assistance and assessment team.

10. New teachers making a difference in their students' lives

Nearly all new teachers (97 percent) reported they were certain that they were making a difference in the lives of the children they teach. However, the new teachers who are currently teaching at the elementary level were more certain about this than were the middle or high school teachers.

PROFESSIONAL DEVELOPMENT ISSUES

During most of the 1990s, the Partnership for Kentucky Schools and the Prichard Committee have been supporting research projects about aspects of school reform under KERA, and particularly the improvement of teacher professional development. In 1995 the Pew Charitable Trusts provided funds to these organizations to undertake a multifaceted, multiyear professional development policy research program in Kentucky. The Partnership has engaged five researchers to pursue this work: G. Williamson McDiarmid (University of Alaska); Jane L. David (Bay Area Research Group); Patricia J. Kannapel (Appalachia Educational Laboratory); Thomas B. Corcoran (Consortium for Policy Research in Education); and Pamelia Coe (Appalachia Educational Laboratory).

In 1997, these researchers issued numerous early reports on the project, including "Professional Development Under KERA: Meeting the Challenge." The executive summary of this paper is reprinted below, with permission from the Partnership for Kentucky Schools.

Professional Development Under KERA: Meeting the Challenge
Preliminary Research Findings
Executive Summary

Kentucky is a national leader in creating a professional development system to support teacher learning. The Kentucky Education Reform Act of 1990 (KERA) gives educators at the school level increased decisionmaking authority as well as more funding for professional development. These additional funds and authority constitute critical resources undergirding the efforts of educators to meet the higher expectations established by the assessment and accountability systems of KERA.

Our preliminary findings, based on case studies of schools across Kentucky, suggest that Kentucky's financial investment in professional development coupled with decentralizing its planning and decisionmaking to schools has paid significant dividends. Professional development opportunities for teachers have expanded greatly, become more focused on student outcomes, and improved in their utility. Our interim findings indicate that:

- Professional development, with teachers in charge, has increased and improved.
- Current policies—including required hours that teachers must accumulate—reinforce traditional views of professional development and limit the options that are considered.
- Current professional development activities are more focused on techniques and procedures rather than helping teachers extend their knowledge of curriculum content and how to teach it.
- Kentucky's assessment system (KIRIS) drives professional development planning at most study schools.
- More promising models of professional development involving intensive, collegial experiences are emerging.
- Promising options for professional development are difficult to implement in many schools.

Professional development opportunities, as might be expected, have focused on informing educators about the multiple elements of the reform. Now, with many pieces in place, educators and

policymakers are at a crucial juncture where attending to the "letter" of the reforms is no longer enough to support continuous improvement.

To help teachers provide quality learning opportunities for students, the goals of professional development need to extend beyond familiarity and compliance and beyond procedures and short-term adjustments. To continue forward momentum requires a rethinking of educators' opportunities to learn and how these opportunities translate into instructional improvement.

In several schools we visited, Kentucky educators have figured out how to create opportunities for teachers to engage in ongoing critical discussions of curriculum and instruction that appear essential for improvements in teaching practices and consequently in student learning. These opportunities are far from the dominant mode of professional development, however. Much of professional development continues to be stand-alone workshops of short duration with no formal follow-up. The need persists, therefore, for teachers to have learning opportunities that are tied more closely to their classrooms, involve analyzing practice with their peers, and deepen their knowledge of curriculum content.

The challenges facing educators in their attempts to implement these new forms of professional development are great. They include deeply ingrained beliefs about how teachers spend their time, opportunities for learning inside schools and outside, as well as policies that influence what teachers deem important in their professional development. Without local leadership that supports teacher learning and policies that encourage and reward a different view of professional development, teachers are unlikely to choose or, in the absence of choices, be able to create the kinds of learning opportunities that will support continuous improvement in student learning.

Kentucky is already tackling many of these challenges. The need for school and district leadership to support teacher learning is being acknowledged and the new Kentucky Leadership Academy represents a significant first step. The need for sweeping changes in Kentucky's institutions of higher education is the primary agenda of the Governor. This focus has the potential to influence the kinds of courses available to prospective and practicing teachers so they become more relevant to teachers' needs.

Similarly, continuing work at the state level on teacher licensing, certification, and promotion holds promise for creating incentives that encourage teachers to pursue more demanding professional development and that encourage providers, including colleges and universities, to change their offerings.

REVIEWER'S COMMENTS

KENTUCKY DEPARTMENT OF EDUCATION
CAPITAL PLAZA TOWER 500 MERO STREET FRANKFORT, KENTUCKY 40601
Wilmer S. Cody, Commissioner
(502) 564-4770

February 1, 1999

Mr. Michael T. Childress, Executive Director
The Kentucky Long-Term Policy Research Center
1024 Capital Center Drive, Suite 310
Frankfort, Kentucky 40601-8204

Dear Mr. Childress:

Thank you for the opportunity to respond to the Long-Term Policy Research Center's (LTPRC) report, *Kentucky's Teaching Force Near the Millennium: Charting a Course for KERA's Second Decade*, by Stephen Clements. As I am sure you are aware given recent conversations which have taken place across the state, I am very concerned about teacher education issues. Dr. Clements' work lends credence to many of the issues which I have already begun to address.

Dr. Clements' recommendations are very much in line with proposals I have made in recent months regarding the improvement of the quality of teaching in Kentucky's public schools. His first recommendation which encourages the creation of a comprehensive data system on the educator workforce is one which I embrace and have begun to pursue. Late last year, I established a work group comprised of Department of Education staff and outside experts to develop the components of a new teacher data system. I am pleased and appreciative that both you and Dr. Clements have been willing to serve on this committee.

Professional development is also an area where the report makes some valuable recommendations and is a topic which I discussed in my 21-point plan on teacher education initiatives which was released in November of last year. Dr. Clements points out the need to "broaden and deepen teacher academic content knowledge and teaching skills," and that is exactly what several of my proposals intend to do. In this area, I have proposed the following:

- establishing "Kentucky Teacher Academies" in the major academic disciplines in all regions of the state,
- assisting middle school teachers of the core academic disciplines who have elementary certificates to acquire at least a university minor or its equivalent in the discipline they are assigned to teach.

- making "academies for teachers" a major agenda of the Commonwealth Virtual University (CVU),
- providing tuition reimbursement to teachers to complete graduate courses in the academic disciplines in the area in which they teach, and
- allowing teacher salary supplements for advanced certification only for certificates in the area of teaching or areas directly related to teaching.

The professional development recommendations of the LTPRC report are parallel with the concerns I have raised and the proposals I have put forth. However, in order to further address the problem of "out of field" teaching, I believe the Kentucky Department of Education must also require middle and high schools to assign to the various classes only teachers who have a minor or major in the discipline taught, or who demonstrate sufficient academic knowledge by passing the Praxis II content examination or some other performance measure. This objective should then be monitored through the new "School Report Card" which would include data on the number of classes being taught by teachers who possess a minor or major in the subject, or who have otherwise demonstrated proficiency in the content of the subject taught.

The next area for which the report suggests policy changes is that of pre-service teacher training. While the report makes some valid suggestions, I believe my plan more specifically attends to this area. I have made the following recommendations:

- setting higher minimum standards for students to enter teacher education programs at the college and universities;
- raising the minimum scores required for certification on the national Praxis II tests to coincide with the performance of students nationwide who take the tests;
- complementing the Praxis II test requirements through the Education Professional Standards Board developing, validating and instituting new "assessment centers" that will evaluate a certification candidate's demonstration of essential knowledge and skill through a series of performance assessments, which are based on the teaching performance standards recently adopted by the Education Professional Standards Board;
- requiring new elementary school (P-5) teachers to complete at least some minimum credit hours in mathematics and some minimum credit hours in science, or demonstrate the equivalent in performance measures;
- implementing an effective program review process to insure that colleges and universities have aligned the content of their teacher preparation programs with the knowledge and skills needed to teach effectively in Kentucky schools;
- approving a university's teacher education program only if at least 80% of its graduates in each program achieve the minimum passing score on the Praxis tests; and
- requiring teachers who were trained out of state and who qualify for a Kentucky teacher certificate to complete a "teaching in Kentucky" program during their first two years of employment.

The report's final recommendations deal with teacher salaries. Though Dr. Clements' suggestions warrant further consideration, I have contemplated some other

ideas to attract more young people to teaching as a career. These policy options were also presented in my proposal:

- providing scholarships/tuition exemptions to college/graduate students who enroll in initial teacher education programs,
- continuing to increase the salaries of teachers and principals every year,
- providing "signing bonuses" to teacher applicants to teach in geographic regions of shortage, and
- promoting and supporting the establishment of Future Teachers of America Clubs in Kentucky high schools.

In his discussion of salaries and career paths, Dr. Clements notes the importance of developing "master teachers." One of the best avenues teachers can follow in order to become leaders is that of the National Board of Professional Teaching Standards. Kentucky should provide financial assistance to teachers to pursue this rigorous certification process. Furthermore, Kentucky can support the "continuous -and energetic- lifelong learning" suggested in the report by providing paid semester-long sabbaticals to highly qualified teachers to become "teacher scholars" who study in-depth the content and methodology of the academic areas and techniques and principles of helping other teachers. Leadership by teachers is vital to improving the quality of teaching in the Commonwealth, but principals must play a significant role too. Hence, as part of my proposals, I have included the need for increasing the standards for admission to the university-based principal training programs and the standards for certification; concomitantly, substantial financial assistance must be provided for those admitted in order to attract sufficient numbers.

Again, I am grateful for the opportunity to respond to the Long-Term Policy Research Center's report, and I appreciate the attention your organization has given to this critical topic. I anticipate the newly established Commonwealth Task Force on Teacher Quality will find this and other recent reports useful as they develop their own set of recommendations toward the improvement of the quality of teaching in this state.

Sincerely,

Wilmer S. Cody

Wilmer S. Cody

WSC/ww

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April 1999

RESEARCH BRIEF

An up-close look at research from
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Kentucky's Teachers: Charting a Course for KERA's Second Decade

by
Stephen Clements

As we near the 10th anniversary of passage of the Kentucky Education Reform Act (KERA), the historic 1990 legislation that rewrote the state's school laws, it seems an especially appropriate time to consider the effects of KERA and other state policies on the quality of Kentucky's teachers for several reasons. First, teacher improvement was at the heart of KERA and education reform initiatives that preceded the reform act. Second, KERA components have now been fully implemented, and evidence about the state's ability to improve public schooling through KERA has been slowly accumulating. Third, the state is nearing the halfway point of its anticipated two-decade-long systemic reform initiative. If mid-course corrections are needed to enhance reforms, the year 2000 may be the ideal time for policymakers to consider them.

This is also an opportune time to examine Kentucky's teaching force in light of a national effort to move improvement of teacher knowledge and skills to the top of federal and state policy agendas. The National Commission for Teaching and America's Future (NCTAF) has spearheaded this movement, but many other organizations, including the two national teachers unions and some state affiliates, as well as groups like the Southern Regional Education Board, are also focusing new attention on policies for upgrading the teacher workforce. Teacher quality is therefore likely to be prominent on the political agenda over the coming years.

Because Kentucky has targeted its reform efforts toward improving teaching, because teacher quality is rising on the public agenda, and because evidence of the importance of good teaching is mounting, it is appropriate for Kentuckians to consider the state of the teacher workforce. This report presents up-to-date information on teachers and teacher policy issues in the Commonwealth and provides a framework for consideration of ways to upgrade Kentucky's teacher workforce.

Stephen Clements is an assistant professor in the Department of Educational Policy Studies and Evaluation at the University of Kentucky and a former intern with the Kentucky Long-Term Policy Research Center.

The Best Evidence about Kentucky's Teachers

The data on Kentucky teacher quality offers mixed assessments. Several recent national studies of teacher quality rate Kentucky's teacher workforce system among the best in the nation, but the indicators used in these analyses are heavily weighted toward measures of a variety of input, rather than "output" measures of what teachers know and what they can do in the classroom. Commonwealth teachers are also about as experienced as their counterparts elsewhere and have achieved significantly greater amounts of graduate training than the typical teacher in the nation. In addition, the ACT scores

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and GPAs of those entering Kentucky's teacher training system in recent years are above state and national averages, and these students carry GPAs above 3.0, even though the minimum acceptable entrance score is 2.5.

More mixed results come from tests given to graduates of Kentucky's teacher training programs. According to 1993-1996 data collected by Kentucky's Office of Teacher Education and Certification (OTEC) from 26 state teacher training institutions, graduates of these programs score at the national average on the three "core" knowledge and skill batteries of the Praxis II exam (the new name for the old National Teachers Examination). They score at or slightly above the national average in several categories, including biology and general science; math; physical, business, and music education; and educational leadership, administration, and supervision. But in a dozen other disciplinary areas, Kentucky teacher training graduates seeking certificates scored below the national median scores on the Praxis subject area exams.

In addition, out-of-field teaching—defined as teaching at the middle or high school levels in a subject in which one has neither a college major nor minor—seems to be a problem in Kentucky, as elsewhere, although its full extent is unknown. According to the national 1993-94 Schools and Staffing Survey studies, the problem in Kentucky appears most acute in English, history, and, as shown in Figure 1, math and certain areas of science.

For this report, a study of middle school math teacher transcripts found that out-of-field teaching is a problem at this level. If teaching "in field" is defined—following NCTAF—as having a math or math education major or minor, only 39 percent of middle school math teachers in Kentucky received sufficient college coursework in math, and the remaining 61 percent are teaching out of field. It is unclear how much of a problem this is in other subject areas and at the high school level.

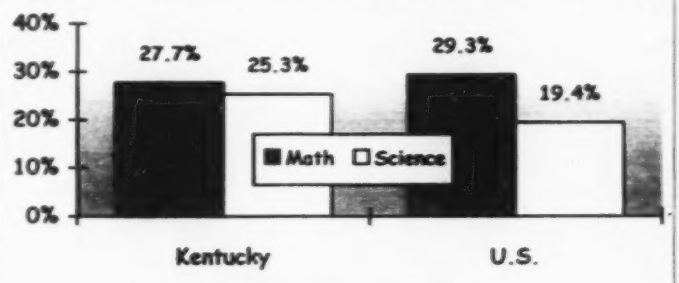
Importantly, the Kentucky Department of Education's (KDE) data collection system cannot assess the extent of out-of-field teaching, as determined by majors or minors. Instead, KDE relies on its certification system, which currently shows an almost fully certified teaching force in the state. Conspicuously absent from the available data is information on actual teacher performance in the classroom, or on relationships between student performance and teacher qualification levels. Simply put, we now have no way of linking the skill and knowledge levels of teachers, either individually or collectively, with the performance of their students—the key outcome variable of the public schooling system.

In spite of the difficulties of measuring teacher quality, data that allow officials to make *some* judgments about teacher quality and student performance should arguably be part of an effective accountability system, as well as a tool for planning professional development and staffing for schools.

FIGURE 1

Out-of-Field Teaching, Math and Science, Grades 7-12, 1993-94

Percentage of Public School Teachers Teaching at Least One Course in Math or Science without a Major or Minor in Those Fields (Schools with 600+ Students)



Source: NCES, 1993-94 Schools and Staffing Survey

Improving Kentucky's Teacher Workforce

Teacher Retirement

The next few years provide an opportune moment to make further changes aimed at improving the teacher workforce, in part because a considerable portion of Kentucky's teachers are nearing retirement age and may be leaving classrooms over the next few years. According to 1997 data from the Kentucky Teachers Retirement System (KTRS), about a quarter of the teacher workforce is at or within about three years of retirement eligibility, 27 years of experience, the average at which state teachers retire.

Teacher Supply and Demand

At the aggregate level, Kentucky does not appear likely to face significant shortages of certified teachers although problems may arise in certain disciplines and geographic areas. One study suggests Kentucky should expect a 1 percent to 4 percent surplus of teachers in elementary schooling, social studies, language arts, math, biology, and art. Slight shortages will likely exist in the subject areas of chemistry and physics, with more significant shortages—6 percent to 8 percent—in teachers certified to deal with learning disabilities, speech disorders, and those with multiple handicaps. However, other data suggest possible greater shortages. A study by the National Center for Education Statistics in Washington, D.C., showed that in 1993-94 between 11 percent and 17 percent of Kentucky high schools had difficulty filling math, physical science, biology, and English teaching positions. One in five elementary and secondary schools reported problems finding special education teachers. If the certification system in Kentucky were changed so that a major or minor in one's subject is the minimum qualification for teaching, teacher shortages would likely be a more serious problem statewide.

Teacher Salaries

According to the latest available data, the average teacher salary in Kentucky during 1996-97 was just under

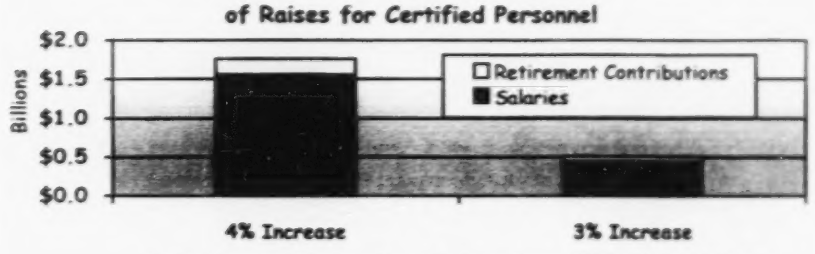
$34,000 per year or about 87 percent of the national average teacher salary. Kentucky teachers have been remunerated at about this level for several years although the percentage drifted downward in the 1980s to around 84. Kentucky's teacher salary average ranks 28th among the 50 states, even though the state ranks 42nd in terms of per capita income. Moreover, the average salary masks the range of salaries: the most experienced and highest ranking elementary and secondary teachers, for example, earn salaries in the $42,000 to $43,000 range while early career teachers at lower rank and experience levels typically receive salaries between $24,000 to $30,000.

Based on an array of salary data, it does not appear that Kentucky teacher salaries are grossly out of line with those of other jobs available within the state that require a similar level of educational attainment. However, we simply do not know how the teacher salary structure affects the quality of those attracted into teaching. Individuals in some white-collar professions, such as law, medicine, and civil engineering, earn considerably more than teachers. If policymakers hope to attract and retain the best and brightest teachers, salaries and career options might more appropriately reflect those available in these more prestigious, highly remunerated careers. While these professionals begin careers at modest salaries, those who excel have much greater financial opportunities than do classroom teachers.

If Kentucky policymakers were to raise teacher salaries across the board and incrementally over 10 years to reach the national average, how much would this cost the state? Assuming national teacher salaries continued to increase over this period at 2.5 percent per year, then Kentucky teachers would need to receive a 4 percent raise each year of the coming decade. At that rate of increase, certified personnel salaries and benefits would be about 12 percent higher than they would be otherwise. The cumulative *additional* spending on certified staff salaries over this period would be more than $1.75 billion. An alternative, and less expensive, scenario would be for policymakers to boost Kentucky teacher salaries from 87 percent of the national average to 91 percent of the national average—which is roughly the cost of living in Kentucky compared to the nation. Again assuming a 2.5 percent national teacher salary growth rate, Kentucky teacher salaries would reach this 91 percent level after 10 years by growing 3 percent per year rather than 4 percent. As shown in Figure 2, salaries and benefits for certified personnel would require an added $500 million over 10 years.

FIGURE 2

Cumulative Additional 10-Year Costs of Raises for Certified Personnel



Annual Percentage Growth in Salaries from 1997-98 to 2008-09

Teacher Training

Kentucky's 26 teacher training institutions are phasing in a performance-based teacher preparation program preparing students to meet standards approved by the Education Professional Standards Board (EPSB), rather than simply fulfilling course requirements. Rather than dictate to teachers colleges what their students must study, the EPSB has identified what new teachers should know and be able to do. Education colleges and departments then determine how to teach students to meet the standards and how to empirically measure student progress. A student may graduate only after demonstrating that he or she meets the standards and is competent in all effective teaching skills.

Many knowledgeable experts believe this new approach will significantly improve the training of educators in the state. The emphasis on demonstrated performance of skills and verification of knowledge levels, proponents argue, will lead to more capable, versatile, learned, adaptable, and self-reflective teachers in state classrooms. However, unless a better teacher data system is constructed, it may be difficult to determine how effective the new system is in training teachers and what effects the differently trained teachers will have on the quality of the teacher workforce. In addition, this new system relies on teacher training institutions to be, in essence, self-policing and self-correcting. It remains to be seen if institutions that informally set lower performance criteria on the new teacher performance standards will be identified. Finally, the movement *away* from minimum coursework requirements may conflict with the assumption that middle and secondary school teacher trainees should have at least a minor in the subject they plan to teach.

Alternative Certification

While the idea of alternative certification has been around for years, some individuals who have extensive subject area expertise and effective communication skills still cannot become certified unless they have many hours of undergraduate level teacher training credits. Alternative certification programs typically allow knowledgeable people into supervised classroom settings without imposing burdensome coursework requirements. KERA, indeed, included a provision requiring KDE to develop and implement an alternative certification program to help channel second-career professionals or others with knowledge, expertise, and

enthusiasm into the state's schools. Though various alternative certification routes have been in place for several years, relatively few individuals have taken them in Kentucky. Although alternative certification seems a sensible approach to human resource deployment, it is unclear what role it will play in the next decade of school reform.

Teacher Professional Development

Kentucky has made considerable strides in increasing professional development funding and vesting control over services at the school and district levels. Kentucky has been spending $14.5 million on professional development or about $23 per student, an expenditure level surpassed in the South only by that of Georgia and North Carolina, both of which have a larger cadre of teachers. National data from 1993-94 show that Kentucky teachers are participating in professional development on important topics at a considerably greater rate than their counterparts in most other states. Several outside researchers have concluded, among other things, that professional development in Kentucky has improved considerably under more direct teacher control and at higher funding levels. But the system needs to improve still more, both to focus more on content knowledge and to shift toward the types of ongoing professional development activities that change teaching behaviors. In general, KDE has very little good data about the scope and quality of professional development services being provided in the state and no way to assess the impact of professional development.

Recommendations

The issue before policymakers regarding teacher quality does *not* seem to be one of addressing a crisis. According to available evidence, Kentucky's teacher workforce is sound compared to those in other states, but the data indicate that some proportion of middle and high school teachers may not have studied the subject matter they teach as extensively as they should have, although the extent of the problem, its geographic distribution, and its effects on student achievement are unknown. Likewise, while Praxis scores of recent teacher training program graduates indicate problems in some subject areas, core battery scores are at about the national average.

Rather, the issue is one of moving more purposively and systematically toward developing a teacher workforce that is equipped to take Kentucky's schoolchildren to higher levels of academic proficiency in the next decade. Current policies seem unlikely to move us rapidly in the direction KERA directs. Student test scores, on both the Kentucky Instructional Results Information System (KIRIS) and National Assessment of Educational Progress (NAEP) examinations, have been improving modestly, which again suggests basic teacher competency in the state. But test scores and other performance indicators have not been rising rapidly enough to meet the ambitious educational goals set for the state in 1990, and suggest that more work needs to be done to improve teacher knowledge and skill levels. Policy changes could be made in a number of key areas.

Simply put, we now have no way of linking the skill and knowledge levels of teachers, either individually or collectively, with the performance of their students—the key outcome variable of the public schooling system.

A Comprehensive Education Data System

A primary policy option is the creation of a comprehensive data system to track teachers in the workforce. Such a system would not be punitive in purpose, but, rather, constructed to ensure that teachers are being properly deployed given their training and backgrounds, to determine what types of professional development and educational support teachers need, to gauge supply and demand imbalances, and to ascertain what combination of teacher knowledge and skills has the greatest impact on student achievement. Until we learn more about these things through a well-designed data gathering program operated over several years, officials will be obliged to tinker with the system based on personal beliefs, experiences, and intuitions, as well as possibly contradictory input from constituents and special interest groups, rather than empirical data. Moreover, unless the right kind of data system is put in place, subsequent efforts to determine the status of the teacher workforce in Kentucky will continue to be frustrated by the lack of policy-worthy information.

A Dramatically Improved Professional Development System

If Kentucky policymakers want improvements in teacher knowledge and skills sooner as opposed to later, they will need to focus efforts on educators already in the classroom and the professional development system, which is presently ill equipped to take on the task. Kentucky's professional development system could be moved in a more productive direction, but to do so would require a concerted state policy effort as well as a variety of incentives to attract—or create—high-quality providers to deliver a professional development program solidly grounded in academic content. Provisions would also be needed to ensure effectiveness and targeted program delivery with follow-up and ongoing involvement. Some professional development shortcomings could be addressed through technological means. Additional policy changes may be needed to encourage academic experts to be more responsive to the needs of the state's middle and secondary school teachers.

Pre-Service Teacher Training

The performance-based teacher preparation system now being phased

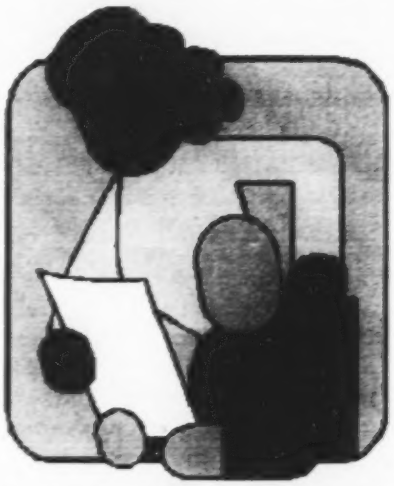
in appears to improve on the previous approach, but the new system should be closely monitored to ensure high levels of academic subject area competence, especially among those planning to teach at the middle and high school levels. Teacher training institutions could, for example, be obliged to publish output or performance measures that would permit evaluations of the quality of the various programs.

It is also difficult to tell if teacher education programs, particularly in the eight state universities, are funded at an appropriate level to implement performance-based education, and in general to prepare teachers for excellence in the classroom. It is conventional wisdom here and elsewhere that university teacher training programs bring in more revenue than they are given in their budgets, and that training teachers is funded at a considerably lower level than training dentists, doctors, and many other professionals. This is certainly an issue that warrants serious attention by policymakers.

Moreover, state officials and others might also engage in a public dialogue about what it means for teachers to be well prepared to teach a particular subject. If Kentuckians agree, for example, that middle or high school teachers should major or minor in the academic subjects they teach, then the EPSB could review policies to determine if this is being done at all institutions in the state. The EPSB could also require previously certified teachers to demonstrate adequate content knowledge, via professional development programs or completion of university courses. It could also oblige teachers who have demonstrated subject mastery to continue broadening their knowledge of content, under the assumption that the ongoing learning process helps teachers remain intellectually nourished and continues to stimulate student minds. In sum, state leaders might consider addressing forthrightly the issue of what defines teacher competence in content area knowledge and ensuring that teacher training become a bona fide lifelong learning system. Teachers would understand early in their careers that they would always be active, reflective learners, with a range of formal learning options available to them throughout their careers. Moreover, they would be rewarded in terms of salary, recognition, and leadership opportunities, thus strengthening the entire school community.

Career Path Options and Salary Improvements for Teachers

It seems unlikely that a policy debate in Kentucky involving only across-the-board teacher pay increases will bear much fruit. Rather, as with the debate over the policy package that became KERA, teacher salary increases might be linked to a range of reforms.



These reforms might focus on multiple career "tracks" within elementary and secondary education, each of which would have different learning demands, time commitments, and professional goals. Currently, all teachers follow roughly the same professional route, regardless of their interests and dedication. They advance through the rank and salary schedule by meeting certain education requirements. And those who aspire to higher salaries or greater responsibilities generally must do so by leaving the classroom and entering the administrative ranks.

An alternative approach would offer additional career tracks that give substantially greater salaries in return for longer contracts, work on a broader range of school-based needs, participation in—and provision to others of—more and better subject matter, intensive professional development activities, the assumption of greater leadership roles in school, and demonstrated performance in the classroom and on assessments of various sorts. The idea here would be to marry compensation to a greater variety of educational skills and knowledge in much the same way that the Highly Skilled Educator program has done, although these career options would be open to a far greater number of individuals than is the HSE program. Teachers would also be allowed to pursue these various routes at different points in their careers and could switch depending upon their interests, personal development, and life situations.

Alternative Certification and a New Incentive Structure

A greater array of teacher career options, with higher salaries, increased responsibilities, and better professional development, might also make the profession more attractive to individuals seeking career changes. The EPSB has approved various alternative certification options although it has done so slowly and with caution. While EPSB's concerns are understandable, it makes sense to continue expanding alternative certification routes. There is no obvious reason why a decision *not* to enter a teacher training program at age 20 should prevent individuals who may have much to offer students and school communities from moving toward the classroom later in life.

Conclusion

This report raises a host of issues about teacher policies. It argues that teacher quality issues will likely be prominent on the public and political agenda over the next few years. It presents a range of data on teachers and teaching in the state, although these data are limited in their usefulness. It hints at the complexities surrounding

teacher workforce issues and policies. And it briefly sketches policy options that might be pursued. This brief look at a limited number of issues could easily be expanded to include other issues that come into play when we reflect on the teacher policy domain.

The key point with which to end the report, however, is as follows. Given the importance of teacher preparedness to the future of public education, its complexity, the limitations on the data, the interconnectedness of the available policy options, and the need for educators themselves to be personally and collectively invested in upgrading the teacher workforce, the citizens of Kentucky need to become actively involved in a public dialogue about teacher quality. Any teacher improvement policy package that might be effective would need a coherence wrought through much public discussion about the nature of teaching, schooling, and community life. Any such reform effort would also likely be expensive, another reason why it must emerge from a political process founded on public discussion of the best and most feasible route to a better teacher workforce. The foundation of such a public debate should be data and information of the sort presented here and of the sort that might be generated by agency officials, researchers, and interest group representatives over the next year or more.

Given the importance of teacher preparedness to the future of public education... citizens of Kentucky need to become actively involved in a public dialogue about teacher quality.

It is likely, too, that such an effort will be the next logical step in the school reform journey on which Kentucky embarked in 1990. Inasmuch as HB 940 represented a down payment upon significant educational improvement in the Commonwealth, then a series of measures to make teaching a profession attractive to a greater variety of gifted individuals and to equip teachers with the skills and knowledge they need to meet KERA's ambitious achievement goals would seem to be a sensible route for policymakers and informed lay citizens to take as we enter a new millennium.

A complete copy of this report is available at our Web site: www.lrc.state.ky.us/lrpre

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